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AN ANALYSIS OF Dr. RUTTY'S METHODICAL SYNOPSIS OF MINERAL WATERS.

Addreſſed, by Way of APPEAL, to

The ROYAL COLLEGE of PHYSICIANS
of LONDON.

BY C. LUCAS, M.D.

Ad Societatem nati Sumus. CICERO de Fin.

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G.R. III.
BRITISH MUSEUM

TO

The moſt learned and reſpectable

The PRESIDENT, CENSORS and FELLOWS

OF THE

Royal COLLEGE of PHYSICIANS
of LONDON.

GENTLEMEN,

I Take the liberty of making this public addreſs, by way of appeal, to YOU, as the NATURAL PATRONS, as well as the moſt COMPETENT JUDGES, of all attempts to cultivate MEDICAL KNOWLEDGE.

From an ambition, which muſt ever demand YOUR countenance, that of diſcharging the duties of my profeſſion, and being as uſeful as poſſible to ſociety, in my ſphere; I lately preſented YOU with a copy of an ESSAY *on Waters*, which I offered the public, upon a preſumption, that I had made ſome uſeful diſcoveries in that part of the works of nature, as well as corrected the errors of ſome of the moſt reputable writers on the ſubject, that had gone before me. And, however ill I may be found to have ſucceded, I hope, the open, artleſs manner, in which I treated that ſubject, will, with my character, conſpire to convince YOU, that TRUTH, and the honor of HYGEIA, the one obſcured, the other ſullied, by the ignorance and craft of her ſpurious ſons, were the principal objects I had in view.

The ſame motives have now impelled me, with ſome precipitation, to take up my pen in defence of the ſame cauſe; when, under the ſanction of ſome great authority among us, a moſt pompous, maſſive volume has been lately obtruded upon the public, bearing the titule of A METHODICAL SYNOPSIS of MINERAL WATERS, &c. under the name of JOHN RUTTY, M. D.

Incumbered as every art and ſcience, eſpecially ours, now is, with the lumber of immenſe volumes, by which the compiler and the bookſeller alone can be gainers; it is moſt unpardonable to burden the public further, in this way, without offering ſomething uſeful or new.

Of all the various branches of the healing art, none has fallen into the hands of ſuch deſpicable writers, as HYDROLOGY, that moſt important part of the *Materia Medica.*

Medicinal waters have too ſeldom been viſited, on any part of the continent, by men duly qualified to make the neceſſary inquiries into their nature and properties. This left room for the loweſt and meaneſt, that could aſſume the guiſe of phyſic, to pitch their tents at ſome of the principal medicinal ſprings or baths; where, it has been generally judged neceſſary for ſuch, to introduce themſelves to the public, by a diſſertation on the water or bath; more to recommend the writer, than the ſubject, whoſe bare name on the titule page, was often taken, onely to give ſanction to the worſt kind of quack-bill. Beſides, from Germany, the world is infeſted with moſt voluminous compilers and tranſcribers, who write and publiſh for the fairs.

I wiſh, we had not room to complain of this evil at home! When I ſat down to give the public the examens of ſome conſiderable medicinal waters and baths, that I had made with ſo much care at the ſeveral ſources, that I thought myſelf able to ſet the perplexed ſubject in a fair light; I could not help curſorily expoſing this ſordid, deſtructive trade.

It was not poſſible for me to attack every individual of the ſcattered multitude of theſe hirelings, till Dr. *Rutty* thought fit to give me this opportunity, by uniting the wretched performances of ſuch writers in one great motley volume.

Before this, few, if any, authors have been hardy enough to write on waters, whoſe ſources, they had never ſeen. Yet our age has ſeen one, who as confidently treats of waters, he never ſaw, as the ignorant originals, from whom he compiles his work; for, they generally wrote, or had ſome pretenſions to write, upon the ſpot.

Yet, Dr. *Rutty*, who gives the world to underſtand, that his *Hydrology* coſt him *one and twenty years' labor*, never ſaw *one* of the *three hundred and odd* waters, he boaſts of treating, out of Ireland, in the natural ſtate: ſo that all he can ſay, of his own knowledge, upon this ſubject, on which he is ſo voluminous, is confined to a few pitiful waters, in the unhappy country in which he lives!

To reſcue the public from ſuch deluſions, I thought it my duty to be as early as poſſible in expoſing this pompous and much puffed work. And the more, becauſe I learned, that it was put off here, under the ſanction of a character given it, by men of ſuperior rank and fame to the author, whom, in himſelf, I might have thought unworthy of my notice.

One thing may demand ſome apology, when I addreſs myſelf to a BODY OF YOUR GREAT EMINENCE and DIGNITY: I ſhall be found to have treated this man, with ſome acrimony, in ſome places, with the levity of irony, and a contemptuous

temptuous ſneer. But, when it is ſeen, that beſides a reproach to the medic art, this man has offered particular, I hope undeſerved, indignity to me; ſuch treatment will hardly be deemed unpardonable. And as for levity, many parts of the writing are found ſo extremely abſurd and ridiculous, that it is impoſſible to treat them otherwiſe than with ridicule and contempt.

I am not ſo arrogant as to inſinuate, that, in all this, I have been able to offer any thing uſeful, that every member of YOUR ILLUSTRIOUS COLLEGE may not diſcern as well, perhaps better than I. But, as YOU may poſſibly think the work of too little conſequence for any of YOU to expoſe it, I beg leave to ſtep in and take up the gauntlet. I have had time to give it onely a curſory reading, having had it not above ten or twelve days in my cuſtody, when this was ready for the preſs; and ſo have probably pointed out but few of it's manifold faults. If YOU judge it worth peruſing, you muſt aſſuredly diſcover many more. I write onely for the information of the public, which, by the conteſts between Dr. *Rutty* and me, as from the colliſion of two dark bodies, flint and ſteel, may catch ſome ſparks of fire to kindle their tinder firſt, then light up their matches, and by theſe, the torches, that ſhew the ways to ſcience and to truth.

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Theſe motives ever demand YOUR ſanction. And this attempt is ſubmitted to YOUR judgement, with all due deference and reſpect, by,

GENTLEMEN,

Your moſt faithful,

and moſt obedient

humble ſervant,

LONDON, July 9,
1757.

C. LUCAS.

AN ANALYSIS OF Dr. RUTTY'S METHODICAL SYNOPSIS OF MINERAL WATERS.

IT is now near three years ſince the public's expectations, of ſeeing the fruits of Dr. *Rutty*'s many years labors in the medical vineyard, were raiſed by ſending a large manuſcript copy of the voluminous work, to be peruſed and offered to ſale by ſome of his friends of the faculty of phyſic in London, I will not ſay of the Royal College.

Theſe were raiſed ſtill higher by the preſenting a plan and ſpecimen of the work to the Royal Society, in one of whoſe meetings, it was ſome time after read; after which the work lay dormant till about the month of April in the laſt year, when a work of the ſame nature was offered to the public, under the humble titule of *An Eſſay on Waters*, in three parts. Treating, I. Of ſimple waters; II. Of cold medicated waters; and III. Of natural baths.

But, no ſooner was this publiſhed, than we ſaw, in the moſt pompous manner, advertiſed, as in the preſs and ſpeedily to be publiſhed, A METHODI-

CAL SYNOPSIS *of* MINERAL WATERS; *(being a work of twenty-one years) comprehending above* 260 *of the moſt celebrated mineral waters, both cold and hot, of Great Britain, Ireland, France, Germany, and Italy, beſides many other parts of the world; wherein the ſeveral impregnating minerals being previouſly deſcribed, and their characteriſtics inveſtigated, each water is reduced to its proper genus; and beſides the particular analyſis, the virtues, uſes, and abuſes of the waters are deſcribed,* IN A METHOD ENTIRELY NEW; *with a far more diſtinct and ample account of the ſulphureous, vitriolic, and copper waters, than has been publiſhed. Interſperſed with tables tending to throw light upon this intricate ſubject: and abſtracts of the principal authors who have treated on mineral waters; and the accounts of writers, diſperſed in the ſeveral learned Societies in Europe, are collected and properly digeſted,* by JOHN RUTTY, M. D. But without the name of place of publication, printer, or bookſeller. Notwithſtanding which defect, the expectations of the public, if not their impatience, were raiſed to the higheſt pitch; but without any further ſatisfaction than ſeveral repetitions of the ſame magnificent advertiſement; till very lately, we are told it is printed for W. Johnſton in St. Paul's Church-yard, where it has actually been publiſhed on the firſt day of the ſeventh month, commonly and profanely called, after a pagan tyrant, July, in the one thouſandth, ſeven hundredth, and fivety ſeventh year of the chriſtian ſalvation.

The phyſical world is at length inriched by this long-promiſed, elaborate, more than *vigeſſennial Synopſis*. Is her expectations fulfilled? I will frankly anſwer for myſelf, the pomp and parade of puffing advertiſements and *ſeſquipedalian* or rather *ſeſquiorgyan* titules, appear no more than the hummhings, hawhings, gruntings, and groanings of enthuſiaſtical ſpirit-pumpers, preparatory to the dull, fanatical, incoherent rhapſodies of religious demoniacs and dreamers. Yea, I will venture to ſay, here, what I ſhall prove in the ſequel, that the Mythologiſt's

Parturiunt montes, naſcitur ridiculus mus.

was never more juſtly applied than to this long-promiſed, highly puffed, and much boaſted *Synopſis.*

To be as conciſe as poſſible with this *ingenious*, I cannot ſay *ingenuous*, author, I muſt ſay, he has not fulfilled any part of his advertiſement or titule page: For 1. his *previous deſcriptions and inveſtigation of the characteriſtics of the impregnating minerals*, are either unjuſt or defective, almoſt univerſally. 2. He is never able, with any appearance of propriety, to reduce waters to certain genera. 3. He never makes a fair, a complete, or concluſive analyſis of any water, never having ſeen one tenth of the waters he pretends to analyſe, in the natural ſtate. 4. Though, as he propoſes, he may *deſcribe*, he can never *aſcertain*, the virtues, uſes, or abuſes, of any conſiderable medicated water, for want of means and opportunity of making regular obſervations on the ſpot. 5. *His method* is ſo far from being *entirely new*, that there is nothing new in it, but the groſs errors and inconſiſtencies of the author. 6. *His tables*, inſtead of *throwing light upon the*, to him, obſcure and *intricate* ſubject, leave it ſtill in *ſhade* and *darkneſs.* And 7. and laſtly, ſo far is he from giving *abſtracts of the principal authors, who have treated of mineral waters*, and from *collecting and properly digeſting the accounts* of ſuch, *diſperſed in the acts of moſt of the learned ſocieties in Europe*, that he but partially mentions the authors, and thoſe of the inferior claſs, among which he is moſt likely to ſhine; not daring to recite thoſe to whom he ſtands moſt indebted; and but curſorily, ſuperficially glances at abſtracts from learned ſocieties and academies. To prove which, I ſhall follow the author's own method, however irregular I find it, and ſtick cloſe to him, from his miſtaken or miſrepreſented titule, to his final concluſion.

He courteouſly begins with a dedication to three eminent gentlemen, that will not all pride at being grouped together in his manner. Theſe are Dr. PETER SHAW, Dr. STEPHEN HALES, and Dr. THOMAS SHORT, conſidering them as *competent judges of*, and *his honored predeceſſors and coadjutors* in, the work. I envy not theſe gentlemen the honors hereby done them; they may deſerve much more from greater clients: I am ever ready to render unto Cæſar, the things that are Cæſar's. How juſt this tribute may be to the *two* phyſicians of the *body*, is eaſily judged by conſidering what has been offered in the Eſſay on Waters, in oppoſition to their favorite notions of *volatile ſteel*, *volatile iron*, *volatile vitriol*, and *ſulphureous waters*. While theſe are judged by the public voice, let me purſue the cringing client, and call, before a juſt tribunal, the aſpiring man, who would raiſe himſelf to a gigantic highth by climing, even by the pocket-holes, and riſing, and ſtanding on the necks and ſhoulders of other men.

Let us, for a moment, turn over his preface, to take a ſhort view of *his method of reducing every water to it's proper genus*, IN A METHOD ENTIRELY NEW. This is ſet forth in his *general view of the work*, annexed to the preface, of which, with permiſſion, we ſhall juſt now take a review: The plan is this; Book I. Treats of *rain*, *ſnow*, and *dew*, and of *ſoft* and *hard waters*; Book II. Of the *nitrous waters*; Book III. Of the *ſaline waters*; Book IV. Of the *chalybeate waters*. Of the *vitriolic waters*; Book V. Of the *alcaline waters*; Book VI. and VII. Of the *calcarious waters*, and particularly of the petrifying. Of the *bituminous waters*; Book

VIII. Of the *ſulphureous waters*; Book IX. Of *Baths*, or of the *hot* and *warm waters*.

Now let us ſee which is the part of this diſtribution, that may be called Dr. RUTTY's. How is *each water reduced to it's proper genus?* And what is there in this METHOD, ENTIRELY NEW?

In the order of the firſt book, there appears nothing new, the moſt incorrect and inelegant compiler, that has had the honor of being the doctor's *predeceſſor* or *coadjutor*, has taken the ſame, or nearly the ſame, inaccurate method, without thinking it *ſynoptical*. But, an author, whoſe name the doctor ſolicitouſly avoids, gives a ſtill more regular method; without claming the merit of being an original, which *our doctor* modeſtly arrogates in capital letters, IN A METHOD ENTIRELY NEW. The author, whom we ſhall at preſent avoid naming in the text, for fear of offending the *original* Dr. *Rutty*, diſtinguiſhes waters into *meteoric*, or *atmoſpheric*, and *terreſtrial*.

The firſt diviſion contains, 1. dew, 2. rain, 3. ſnow, hail, froſt and ice, which generally give the moſt light, ſimple, ſoft waters. The ſecond diviſion comprehends two claſſes of water; to wit, 1. the ſimple or ſweet, rather inſipid, waters; 2. the more compound and ſapid, or as they are commonly called, the mineral waters.

The firſt is diſtinguiſhed into, 1. ſprings, 2. wells, 3. rivers, 4. lakes, 5. ſtagnant waters. The ſecond comprehends all the mineral or medicated waters, of which a moſt ſimple and familiar ſyſtem is layed down, as ſhall be ſet forth more at large by and by. See An ESSAY on Waters *, part I. p. 25 to 37, part II. introduction throughout, particularly p. 3, 4, 5, 6, 7, and ſo on to p. 22, and ſo on to p. 26. And hence, determine what there is *entirely new* in Dr. *Rutty*'s firſt book, and ſee whether he has done the public, this author, or himſelf, the juſtice to make *fair abſtracts* of writers, or to publiſh any thing on this ſubject ſo full, ſo explicit as ſome that have gone before him, particularly his immediate *predeceſſor* and his *corrector*, though not his *coadjutor* in the work.

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* By Dr. Lucas, in April 1756.

Now we muſt come to give the *methodical ſynopſis* credit for a piece of novelty in it's order, ſomething *entirely new*: Book II. gives us the *doctor's nitrous waters*, Book III. his *ſaline* waters; the *particular* before the *general*. However crude the *doctor*'s notions of nitre are, all the *nitres* he knows are *ſalts*; but all the *ſalts* are not *nitre*. *Saline* waters then ſhould ſurely make a *general* head, under which all the *particular* kinds ſhould be compriſed, and ſeverally diſtinguiſhed. But then indeed the *method* might not be *entirely new*: for it was pointed out in the ESSAY *on Waters*. Here, it is as new, as it is irregular and immethodical.

Next after *ſaline*, the *doctor* introduces, Book IV. *chalybeate* and *vitriolic* waters; that is, *metallic* waters, from the correſpondence of *metals* and *ſalts*, in his *new method*. And from the affinity of theſe, which are always *acid* waters, with *alcalies*; the immediately following Book V. treats of *alcaline waters*. Theſe would probably have been placed among the *ſaline* waters, a claſs to which alcalies unqueſtionably belong; but to make out a *method entirely new*, it was found neceſſary to place them here, though the ſeparation required the force of Herculean ſtrength, as it did to make *ſaline* mean onely *ſalt* waters.

But there is nothing leſs new in the next head, Book VI. and VII. where two books are moulded into one, and *calcarious*, particularly *petrifying*, waters and *bituminous* waters are lumped together, from the evident *incoherency*, but *novelty*, of conſidering *ſtoney* and *oily* bodies in the ſame view.

In the following, Book VIII. *ſulphureous* waters, bearing no relation to *bituminous*, and ſtill leſs to *calcarious* and *petrifying* waters, are introduced; no doubt from the ſame view to *novelty* and *diſorder*.

And in Book IX. all *baths*, let their impregnation be what they may, are indiſcriminately conſidered in one view, that is, as by an expletive explaned, *baths*, or *hot and warm waters*. Where again, for the ſake of ſtudied *novelty*, *hot* is put before *warm*; not that the *doctor* is quite ignorant, that water muſt be *warm* before it can be *hot*, but that he may not follow *vulgar* modes, but be in all things *ſibi conſtans*, an *original*, *entirely new*.

Thus we have given the reader *the author's general view* of his curious *ſynoptical* work. Before we turn back to the *preface*, and take another view of our *curious original* in that *new* piece, let us glance at a remarkable reformation made in this wonderful work, ſince it was firſt offered to the light.

It is aſſerted by a gentleman of ſenſe and probity, who was at the meeting of the ROYAL SOCIETY, when the general plan of this *ſynopſis* was there read, that in the plan there propoſed, there were moſt incongruous, contradictory epithets given waters, in order to make out *heads* for this *ſynopſis*. Thus it was reckoned an invention curious and new, to denominate waters from quite oppoſite materials, extracted from it by means of chemiſtry. Hence claſſes were formed unknown in nature; ſuch as *acid and alcaline*, *alcaline and acid*, *acid and calcarious*, *and calcarious and acid*, and the like. With equal propriety, *the author* might ſay modern nitre, or ſea ſalt, is an acido-alcaline ſalt; becauſe by chemical torture an acid and an alcaline ſalt may be extracted from either, when the aggregate of each, in fact, makes but an uniform neuter ſalt.

Yet with theſe and ſundry ſuch like abſurdities, was this work ſent to London for publication: but after it was in this manner more than once advertiſed, even gazetted, the work has been called back, reviſed and reformed. How came this reformation? The abovementioned ESSAY on Waters, a work which was found beneath Dr. *Rutty*'s notice, unworthy of being abſtracted, or perhaps in general beyond his reach, was publiſhed the laſt year. In this, the extravagance of the attempts of WALLERIUS and others, to give ſyſtems of mineral waters, and the abſurdity and incoherency of their ſynoptical epithets, are expoſed in a manner hardly to be anſwered *. After this, ſome ſubtil eſſences, that render water a more powerful ſolvent, are ſet forth and explaned, ſuch as, 1. the *ſimple volatile, mineral ſpirit* †; 2. the *volatile mineral alcaline ſpirit* ‡; 3. *the volatile, univerſal* or *vitriolic acid* ‖; 4. the *phlogiſton*, or inflammable principle §; and after the *exiſtence*, *nature*, and *properties* of theſe are demonſtrated, an eaſy, familiar, ſimple, natural ſyſtem of mineral waters is layed down; ſuch as comprehends all the different kinds hitherto known **.

Now, whether or not this had any and what ſhare in the reformation of Dr. *Rutty's Synopſis*, ſo far as to make it leſs abſurd than it was, I ſhall not aſſert. The *Doctor* is very excuſable in not mentioning the work, becauſe the chemical and philoſophical parts of it are probably far beyond the reach of his capacity: and taking and acknowledging a few fragments out of it, would onely ſerve to make his *motley* work appear a greater piece of *patchwork*, an *harlequine's coat*, or rather a ſort of *liſting carpet*; for he never gets beyond the *ſelvage* of any writings, but thoſe of the celebrated doctors SHAW and

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* Part I. p. 3, &c. † p. 9. ‡ p. 12. ‖ p. 13. § p. 17. ** p. 23, &c.

SHORT, his moſt worthy *predeceſſors*, *coadjutors*, and *patrons*.

But, whatever averſion Dr. *Rutty* might have had to the Eſſay on Waters, he certainly ſhould have remembered the author with ſome reſpect and gratitude; ſince he owes more of the little he knows of natural hiſtory and the mechanical part of chemiſtry to the author of that ESSAY, than to his *patrons* or to any authors he mentions, or to any other perſon; if another apothecary, truly ſkilful in every branch of the pharmaceutic art, be excepted. In Ireland, I believe it will be judged, I here mean Mr. HENRY BARTON, at preſent an apothecary of the firſt eminence in Dublin, and Charles Lucas, once of ſome eminence in that profeſſion in the ſame city, till a combination of political proſtitutes in power, by lawleſs force, baniſhed him his country.

If Dr. *Rutty*'s memory has not with his gratitude failed, he muſt confeſs the manifold inſtructions he has received from both theſe artiſts, jointly and ſeverally. It is not improbable, their example and documents have made no great impreſſion upon him. But notwithſtanding, a more knowing man would not be aſhamed to give a public acknowledgement of his obligations to their intentions and the pains they had ſeverally taken with him, tho' to ſo little purpoſe, as to reflect no honor on either.

But, to rub up the *Doctor*'s ruſty memory, and, if poſſible, brighten his other ſenſes, I think it proper to put him in mind, that he was not able to account for the phaenomena of his own multitudinous experiments, without the aſſiſtance of one or other of theſe apothecaries. To give him a remarkable memorandum: let him recollect by what means he come to learn the compoſition of the acid water near *Nobber*, in particular. Did he not labor with his old *coadjutrix*, I do not mean either of his *patrons*, I mean old *Deborah*, his amanuenſis? Did he not labor with her for ſeveral days, and go through the extent of his borrowed *liſt* of experiments, without being able to conceive any notion of the impregnation of this *common vitriolic* water? Was he not forced to *confeſs his ignorance* to *Barton* and *Lucas?* and to requeſt, in his *ſtiff-necked* manner, their aid in exploring the ſecret? Did not *each* of them ſatisfy *him*, that *they* ſeverally diſcovered the compoſition? Did they not *each* give *him* an *artificial water*, made upon the inveſtigated principles, which he could in no wiſe diſtinguiſh from the natural? And did *they* not, after a few *ſneers* at his *ignorance*, *ſhew him*, that *one* made the artificial water by a ſolution of common green vitriol, calcined to *colcothar?* the other, by the *waſhings* of ſome *black-ſlate?*---A ſenſible or good man could not forget this, with many other obligations of the like kind: but what will not vane men attempt, to appear *originals?* to make themſelves and the world believe their works *entirely new?* Theſe two ſimple experiments, the *Doctor* gives as his own, with the experiments made to prove their analogy, without once glancing at thoſe from whom he learned them.

But I muſt have another pluck at this gawdy bird, that plumes himſelf ſo highly at the expence of his honeſt neighbours, which he looks down at, without vouchſafing to know the deplumed birds, by means of whoſe pinions he affects to ſoar aloft.

It is then affirmed, that he made a conſiderable progreſs in his experiments and writing, without knowing the difference between uſing common river and deſtilled water in making his moſt accurate trials and comparative analyſes; that he did not know a pure alcali; that he uſed the ſtrong undiluted mineral acids, without knowing the difference of their effects from thoſe of the dilute; that he had not one pure metallic ſolution, but uſed *gold* and *ſilver allayed* with *copper*, inſtead of the pure metals in his ſolutions; till he became acquainted with *Lucas* the apothecary, who got him deſtilled water, ſhewed him the neceſſity of uſing it in his infuſions, ſolutions, &c. and made him all the metallic ſolutions, for the firſt time he had ever ſeen them in purity. Yet, all theſe are now forgotten, and *Lucas*'s aſſiſtances, by his *private labors*, as well as his *public works*, are ſo far out of the *original Doctor*'s account, that the name of his *benefactor* is not once mentioned; except as a culler of ſimples, p. 226, and in one inſtance more, for the ſake of contradiction, if not ſomething more mean. See *Synopſis*, p. 350. Where he ſays, CHARLES LUCAS, apothecary, who examined it in July 1740, affirmed it yielded him 136 granes from a gallon. Whether he did *affirm* it ſo or not, there is no proof, but *John Rutty's affirmation*. Take it who will. But ſuppoſing the apothecary did; the *word*, or as *the Doctor* chooſes it, the *affirmation* of one, *accuſtomed* to works and experiments in *chemiſtry*, of whoſe knowledge and accuracy the *Doctor* had ſome convincing proofs; may be as credible as that of a *chirurgeon*, ſo *unskilful* in the nature of matter and the rules of the *chemic* art, as to truſt to the evaporation of a mineral water in a porous, earthen, glaſed veſſel; by which means, according to his *affirmation*, he could not aſcertain the quantity of matter yielded upon evaporation, between the extremes of 28 and 48 granes in a gallon. *Synopſis*, ſame page.

Thus aſſiduous would the *Doctor* be in finding fault, if he knew how. Why did he not attack the Eſſay on Waters, and ſhew faults in that? He choſe to make it appear, he never ſaw it; to have the fairer opportunity, if not of ſtealing from it, at leſt of correcting his moſt palpable abſurdities

by

by it; without having the ſenſe, manners, juſtice, or regard to the public, or his own promiſe, to acknowledge it.

Having thus explaned the *diſpoſition* and *character* of this *great* writer, let us now take a review of the work, and ſee how truly worthy of the tree, we ſhall find the fruit; ſee whether it be not *vox et preterea nihil.*

In his preface, p. vii. he gives us a detail of the ſolid matters, with which he apprehends waters are found impregnated univerſally; but ſays not a word of the ſeveral ſubtil, volatil ſpirits, nor of the oily matter, with which all waters are ſhewn to be more or leſs impregnated, in the ESSAY on Waters.

In p. viii. he aſſerts, that 'there is ſcarce any chalybeate water without ſome mixture of ſulphur, &c.' And yet he is none otherwiſe able to prove this, than if he ſhould ſay, there can be no ſolution of gold, ſilver, or any other metal, without ſulphur. It is equally true of the one as of the other. But, *ſulphur* is a very convenient word with the *Doctor*; ſometimes it means *brimſtone* with him, as in this particular inſtance, which he is never able to prove; at others, it is the *inflammable principle* of bodies, *oil*, *reſin*, *fat*, *animal*, *vegetable*, or *mineral.* Behold the *Doctor*'s Catholicon!

But, the principles, on which the *Doctor* founds his inquiries, are layed in his *preface*, p. ix, &c. I ſhall overlook many of his numberleſs inconſiderable, to expoſe ſome of his groſſer and more dangerous errors; which alone will make me too voluminous.

In his firſt ſet of quaeries, he clearly demonſtrates to the world, that he is quite a ſtranger to the principal rules of chemiſtry, moſt uſeful in the examination of waters. His third queſtion is, *Does a water whiten*, which it is to be ſuppoſed, he takes in the paſſive ſenſe, *does it become white*, *coagulate*, or *continue clear with*, we may ſuppoſe he means upon the admixture of *the alcalies*, as *oil of tartar per deliquium*, *ſpirit of ſal ammoniac* or *ſpirit of hartſhorn?*

According to his own explanation of this quaere, in the note at bottom, he looks upon theſe alcalies to be the *precipitators*, as he calls precipitants, of the cloud or ſediment, occaſioned by their mixture with the water. And here he happens to be right. But in his fourth, he falls into inextricable confuſion: for he looks upon the ſolutions of *ſilver*, *lead*, *alum*, and *lime*, to be *precipitators*, as well as *alcalies*; and aſcribes the *whiteneſs*, *coagulation*, or *precipitation*, occaſioned by the mixture of *theſe* with any *water*, to the *earth* contained in the water, as if this were the *precipitand.*

Now, had this *ſagacious enquirer*, this writer in a *method intirely new*, but conſulted one of the aprentices of either of his *now-deſpiſed* preceptors, *Barton* or *Lucas*, they would have ſhewn him, that the *ſolutions* of *ſilver*, *lead*, *alum*, and *lime* are ſo far from being the *precipitators*, that they are the *precipitands:* for the *ſediment they* occaſion is the *magiſtery* of *ſilver*, or *lead*, or the *earth* of *alum*, or *lime water*, precipitated by ſomething in the water, which alone is the *precipitator*, or *precipitant*; and that, when a water does not contain this precipitator, then there can be *no precipitation.*

But, in the ſequel of the note upon this quaere, he ſhews he *does not know* the various *precipitants* of theſe *ſolutions*, which he falſely calls *precipitators*, and which precipitation, he as falſely aſcribes to the *earth* in the water. So far is *all earth*, in a ſtate of ſolution, from being the moſt powerful *precipitant* of theſe *ſolutions*, that *moſt ſalts* are found more effectual. Thus, the *acids* of *ſalt*, and of *vitriol* or *ſulphur*, ſolutions of *ſalt* or *vitriol*, in any water, cauſe a precipitation of the diſſolved *ſilver* or *lead* added. And *all alcalies* do the ſame, and are ſtill the moſt effectual *precipitants* of diſſolved *alum* and *lime*.---Here, it muſt be confeſſed, the *Doctor* ſhines in a *method entirely new:* for, I will venture to ſay, our age has not produced a writer ſo unqualified for treating on mineral waters, as Dr. *Rutty*, his *two celebrated patrons* not excepted. Indeed, he can make experiments, ſuch as they are, as faſt as the beſt of them; but in accounting for their effects, he is more ignorant or defective than any man who has yet appeared on the ſtage. But ſo likely is he ſtill to impoſe upon the multitude, that a lover of truth and the public can not diſpenſe with the laying ſuch an author open.

It would be endleſs to point out the number of uncouth phraſes, falſe epithets and other abuſe, miſpriſion, and coinage of words, of which our author is univerſally guilty. But I muſt glance at a few of them, which ſhew his ignorance of the Engliſh language in general, as well as his being an intire ſtranger to the language of the chemiſts.

All the writers that pretend to accuracy of expreſſion in this way, nicely and juſtly diſtinguiſh between *fermentation*, *putrifaction*, *efferveſcence*, and *ebullition*.

Yet from the firſt line of p. x. of the preface, to the laſt of the work, theſe are generally confounded or otherwiſe abuſed by Dr. *Rutty*, who aſks, *Does it ferment with acids?* when all confeſs acids prevent fermentation; of which the *Doctor* is not quite ignorant; for he ſays as much of the effects of alum and vinegar in *ſtopping fermentation*, p. 216. Of a piece with this are his 7 and 9th quaeres. Let me aſk any man, the *Doctor* not excepted, what idea can be affixed to theſe words, *Does it curdle with ſope?* Water either diſſolves or does not diſſolve, lathers or does not lather with it; or a ſolution of ſope, being mixed, with a water, unites with, or ſeparates from it, or ſuffers decompoſition. Sope then, in the vulgar phraſe, may be curdled in an hard water; but the water can not curdle with any ſuch matter. The 9th quaere is, *What tincture does it extract from galls, ſumach*, &c.? This may be aſked with regard to the more ſimple waters. But, with reſpect to the mineral or metallic waters, we can not ſo much learn what colors theſe waters *extract*, as what colors they *ſtrike* with aſtringent vegetables, &c. But, in theſe like inſtances, I give up the learned *Doctor*, as quite incorrigible.

His 8th quaere is, *Does it redden beef or mutton infuſed, and then boiled in it?* From the anſwer to this, he would infer, by his note, whether or not the water contained the nitre of the antients or the native purging ſalt, which he affects to rank among nitres, though it has not a ſingle characteriſtic of the nitre of the antients or moderns. But in this, I aſſert, or if he chuſes the word, *affirm*, he is much miſtaken. Any of theſe ſalts, it is true, lying on the fleſh of oxen, ſheep, or ſwine, admit of a certain degree of putrifaction, which reddens the fleſh. But no ſolution of them, yet diſcovered in nature or in art, as far as three, four, or ſix drachms to a quart, will cauſe any alteration in the color of fleſh ſeethed therein. All the alcaline waters of Italy, France, and Germany, thoſe of Aken and Borſet to my knowledge, boil fleſh of all ſorts, as white as any other water whatſoever. Yet, abſurd as our *hydro-ſynoptical Doctor* is, in other reſpects, he can not deny the exiſtence of the nitre of the antients or natron in theſe waters.

In page xi. as a teſt or indication of the exiſtence of ſea ſalt in a water, he gives the reſidue after evaporation's moiſtening in the open air. I appeal to all that have ever conſidered the ſubject, the *doctor* onely excepted, whether undecompoſed ſea ſalt was ever known to deliqueſce or moiſten in a dry air.

Where indeed the muriatic acid is united with an abſorbent earth, we have a kind of phoſphorus, deſcribed and explaned in the ESSAY on Waters; which of all other dry bodies is the moſt apt to attract the humidity of the air, and grow moiſt, or run liquid. But a marine ſalt water, evaporated ſlowly to a dryneſs, gives the proper cryſtals of ſea ſalt; which, according to their purity, ſtand or diſſolve in the air: beſides, fixed alcaline ſalts diſſolve in the air. Theſe ſhould ſurely be properly diſtinguiſhed. But this, the *doctor* could not, or has not thought fit to do, for reaſons beſt known to himſelf.

On the ſame page, he gives us to underſtand, that the emiſſion of acid fumes, upon the effuſion of oil of vitriol, is an indication of ſea ſalt in the reſidue of any water. Good friend *Rutty*, gueſs again; and tell us, does not Epſom ſalt, the evaporated mother of ſea ſalt, and ſalt ammoniac, by this means, give preciſely the ſame fumes with ſea ſalt? And does not ſaltpetre give as acid fumes as either? In the next edition of thy book, diſtinguiſh the quality of the ſeveral fumes that may be raiſed, upon the addition of oil of vitriol to any reſiduum: and ſo mayeſt thou appear more correct, if not more ſenſible. If thou wert leſs preciſe in thy common converſation and deportment, and more ſo in thine experiments, and expreſſions, it might be better for thee and thy readers.

On the ſame page, he makes the turning of ſirup of violets green, *give ſuſpicion onely of an alcaline ſalt*. Hence then as iron, abſorbent earths, particularly lime and alum, which gives every proof of acidity, and a ſolution of the vitriol of copper, as he himſelf declares, p. 261, all very ſuddenly cauſe a greenneſs in ſirup of violets; theſe muſt *raiſe a ſuſpicion* of their being alcaline, in the *doctor's* mind! Who will deny this being *intirely new?* But the

Doctor learned the exception to this, before his book was publiſhed, and inſerts it, p. 205, forgetting to alter his poſition in all parts of his book, and again clearly contradicts himſelf; p. 216, and again, p. 261.

Here alſo, the *Doctor* tells us, that the *reſiduum* of a water's cauſing a *quick urinous ſmell* upon rubbing with *ſalt ammoniac*, or a *yellow color*, with *corroſive ſublimate*, is a proof of a *native alcali* or *natron*. Accurate writers diſtinguiſh the *native alcali* into *two kinds*, the *volatile* and the *fixed*. The *later* alone can produce theſe effects. See how this agrees with the 8th quaere, pref. p. xii. where ſalt ammoniac and ſalt of tartar are made to anſwer the ſame teſt. See the following paragraph. Sure the *Doctor* muſt have a violent propenſity to appear *intirely new*, or he would have made theſe diſtinctions.

Here, the *Doctor outdoes* his uſual *outdoings*: for fear of ſuſpicion of miſrepreſentation, I ſhall cite his own words litterally. Quaere 8. *Does it*, i. e. the ſalt of any water, *excite an urinous or pungent ſmell when rubbed with ſalt of tartar?* On which the learned author comments thus; *It ſhews natron or the nitre of the antients.* I am loſſed in amazement and confuſion at this ſuperlative blunder: it is ſuch as a ſenſible apothecary would correct his apprentice for. There is hardly a Tyro of three years ſtanding, that does not know, that pure fixed alcalies of all kinds mix together, without any change of ſmell. Every one knows, that natron or the nitre of the antients, is the native fixed alcali, which ſuffers no change upon mixture with an artificial fixed alcali. Any matter's yielding a quick, pungent, urinous ſmell, upon the admixture of a fixed alcali, gives demonſtrative proof of a volatile alcali, either generated by the mixture, or ſeparated from an union with ſome acid, that of ſea ſalt particularly; which, with a volatile alcali, forms ſalt ammoniac, what the *Doc-*

tor's experiment indicates, inſtead of natron. Hence, let any man judge, what confidence is to be repoſed in the medley experiments of ſo confuſed an head. Yet in this, he appears quite poſitive; afterwards aſſerting it from experiments *. It is a doubt with me, he never ſaw a *pure native alcali*.

Yet in ſpight of theſe and numberleſs other palpable enormous abſurdities, the *Doctor* boaſts of the progreſs of his enquiries in the *examination* of 309 *different ſprings, and aſſures himſelf of a full recompence for his great labor and expence.* Being perſuaded, *that this method of examining ſo great a number and variety of waters in concert,* though it be void of any rational deſign, regularity, accuracy, truth, or ſenſe, *muſt neceſſarily throw a far greater light on the ſubject, than only a few waters ſolitarily examined*; a word to all that do not give ſuch a *methodical ſynopſis*, which is only to be formed from ſuch accurate experiments and judicious obſervations as theſe of *Dr. Rutty. Riſum teneatis amici!* I now take my leave of the *preface*, thinking I have given a pretty fair ſpecimen of that and the author, in the little I have thus examined of it. Now to procede to the *great work* itſelf; but firſt of the *ſynoptical tables*.

Theſe are interſperſed throughout the work, *with intent to throw a light upon the intricate ſubject.* They are ſuch tables as all men make, who ſet about a comparative analyſis of ſeveral waters. Theſe are made by ruling a ſet of columns upon a ſheet of paper, one for the name of the water, and one for every experiment to be made upon it. Thus the firſt perpendicular column contains the names of the different waters, ſeparated by lines drawn tranſverſly between them, and parallel to each other. At the head of each column is ſet down the experiment, ſo as to ſtand in a ſucceſſion, according to the plan in the preface. So that under each denomination, and in a line with the water ſet down in the firſt column, the obſervations on the experiment, the uſes of the water, or the like, are ſet down, with intent to ſhew the comparative analyſis of ſeveral waters, at one contracted view. This, well executed, has it's uſe; as it is a compendium of the experiments and obſervations made on the waters.

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* P. 408, 409.

But let us ſee how the *doctor* has proceded in his tables: I muſt confeſs, in a *method intirely new*; for there is not a ſingle table completed in any thing, but the lines and form, throughout the whole book. To begin with the firſt marked (AA) intituled, *Experiments in concert on fourty three ſeveral ſpecimens, for the moſt part ſprings of ſoft water, rain, and ſnow.* Now to ſhew how theſe *experiments in concert* are carried on under their reſpective heads, which are, 1. hydrometre, 2. ſope and alcalies, 3. ſolution of ſilver, 4. ſolution of lead, 5. ſolution of alum, 6. lime water, 7. acids, 8. fleſh, 9. ſirup of violets, 10. galls, 11. ſumach, 12. logwood, 13. rhubarb, 14. aſh-bark, 15. tea, 16. quantity of ſolid contents, 17. quality of the contents, 18. uſes. The firſt water ſet down as examined in *concert* is that of Combe: but it's range under all the heads, except one, *contents*, is every where left *blank*. The ſecond, *Black Glyn* water, has the ſpace under three heads filled thus, *lathered without curds*, *Gr.* 5. *marine ſalt*, *nitre and a little calcarious earth*; and out of ten waters ſet down, there are not two, on which there are more than three experiments ſet down out of eighteen. Whence, out of 180 ſpaces made for recording the experiments in *concert* in this table, there are but 42 filled, ſo that there are 138 *left blank*. Thus the *doctor* means his tables *ſhould throw light upon the ſubject!* See the advantages of examining waters in *concerto!* Who can deny his *method's being intirely new?* Let no man imagine our *Doctor* a dull, Dutch genius, by his being upwards of twenty or twenty-one years engaged in this work: it is plane, by the number of experiments above ſet down, he made two a year, which comes to juſt the number here, 42. Now, if it pleaſes the moon and ſtars to ſpare his valuable life but 69 years longer, he will have time to favor the world with a complete table; that is at two a year, fill up the 138 blanks now left. If thoſe who have layed out their guineas for the thus *illuminated* work be diſcontented, let them make the experiments themſelves, and with their own pens *fill* up the *blanks*. It is ſaid to be a ſage piece of advice of the poet, *Keep thy piece ſeven years*; but three times ſeven are not ſufficient to bring *Dr. Rutty*'s piece to maturity.

I thought I had gone through the firſt table, but, on turning over, I find myſelf miſtaken: it is continued marked (BB), (CC), (DD), EE); the ſecond part indeed, (BB) is not more complete than the firſt. It is comprehended in 198 ſpaces, of which 45 are filled, ſo that 153 are left blanks to be filled by ſucceeding geniuſes, at leiſure. Let who will examine the reſt. I own myſelf, as I ſuppoſe the reader is, tired with looking over theſe. So far then for the doctor's *concerts* of *experiments*, as he calls them, and his *illuminating*, *blank tables*. Now for a little view of the *one and twenty year's* work at large.

I ſhall overlook want of method, regularity and order, throughout this whole maſſive work, to come at thoſe miſtakes that may be of worſt conſequence to ſociety, if not detected. In p. 2. he aſſerts, that waters derived from the higheſt mountanes are the moſt pure. And backed by excellent phyſical authority * for his purpoſe, tells us, as a proof, *that* Switzerland *abounds with ſuch waters*.

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* Salmon's Hiſt.

All naturaliſts are agreed, that the hardeſt and moſt impure waters come from the higheſt mountanes. This the antient poets ſung. It was notorious to a proverb: *Quis tumidum Guttur miratur in Alpibus* * ? This was once attributed, through miſtake, to the ſnow waters; but more accurate obſervations ſhew this *Bronchocele* to ariſe from hard waters; ſuch as the author of the ESSAY on Waters ſhews in *Paris*, *Rheims*, *Spa*, &c. Theſe are more common in high mountanes than elſewhere. *Switzerland* is univerſally mountanous, and part of the *Alpes*, are called *Rhetian*, from the country to which they join and belong. Thus we ſhall elſewhere find the *Doctor*'s poſitions and his quotations much of a piece; as he ſeems to have read but the worſt writings of the worſt authors.

Who ſhall pay the acknowledgments, due to this *expert practitioner*, for the diſcovery of an *univerſal remedy* for all the diſorders of the eye, of what kind ſoever they be, provided they are *ſore?* Thus his *method* of *practice* is as *new*, as that of his *ſynopſis:* for, while our ordinary phyſicians and chirurgeons take pains to diſcern the nature and cauſes of the diſeaſes of all parts of the body, particularly the eye, and ſometimes find ſome of the hard, and at other, the ſofteſt, lighteſt, and pureſt waters, the fitteſt applications; this ſage, who ſhews his knowledge in phyſic, chirurgery and chemiſtry to be much upon a par, peremptorily pronounces, without telling even from what acid, what ſalt, what ſtoney, earthy, or metallic matter the hardneſs ariſes, *that hard waters are the beſt waſh for ſore eyes*, indiſcriminately. However abſurd this may appear, he is as lax and vague in aſſigning the further uſes of hard waters, whether œconomical, mechanical, or medicinal. See *Synopſis*, from p. 5 to 7.

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* Juvenal.

On p. 7. *our learned and accurate author* comes to explane ſome of his *blank* tables of ſoft waters. 1. How uncertain and indeterminate his methods of diſcovering the ſpecific gravity of water by the hydrometre, is clearly ſhewn in the Essay on Waters; yet Dr. *Rutty* relies intirely upon this inſtrument.

2. He alſo relies much on the trial of waters by ſope; and it is undoubtedly one of the ſimpleſt and readieſt means of diſcovering whether a water be hard or ſoft, and in what degree, to a man that knows how to uſe it: but, in the *Doctor*'s method, it can determine nothing; for there is no water known ſo hard, that is not extremely acid, as not to lather, with a ſufficient quantity of ſope and agitation. It is a wonder, a man ſo intimately converſant with the *principal authors*, and that dedicates to *two* of them, ſhould not have learned, that the onely method of making an accurate trial of this kind by the means of ſope, is by dropping a clear ſolution of it into the water to be tried, and mixing it, without the agitation, neceſſary to lather, which alone is often ſufficient to decompoſe and ſoften ſome of the hardeſt waters. How well the *Doctor* is capable of judging of, or ſelecting the *principal authors*, upon this occaſion, may be ſeen by wilfully omitting the cleareſt explanation given of this method, in the Essay on Waters, Part I. p. 104, 105.

3. Here, he repetes the ſame error, he before embraces in the preface; by telling us, that the ſolutions of *ſilver, lead, and alum, and lime water, ſhew the different quantities of terreſtrial matter in each water, in proportion to the different quantities of the ſediment precipitated.* That the precipitations here, depend more on ſalts than earths, and that the precipitates are the calces or magiſteries of metals, or the earths of the ſolutions, has already been clearly

made out, p. 12. as it is fully and clearly explaned in the general idea of ſalts, and the method of trying and chooſing waters, in the ESSAY on this ſubject before cited, but affectedly overlooked by our ſuperb author, who cannot be ſuppoſed ignorant of ſuch eſſential rules of chemiſtry.

4. He confounds *ebullition* with a more favorite word with him in the ſame ſenſe, *fermentation.* For this, the author of the ESSAY on Waters is partly to blame. As that word was not to be ſeen in all the *doctor*'s manuſcript, till this ESSAY appeared: and yet ſince, *our author* has taken it in, and abuſed it as he had before more frequently done the other word. But here, he ſays, *the ebullition of any water, or it's ſediment, with acids, ſhews calcarious earth.* The ESSAY on Waters ſhews, that *alcaline ſalts* in waters do not leſs produce this effect, and that in the ebullition, a more ſubtil, volatil acid gives place to a groſſer and heavier. But this was not worthy of Dr. *Rutty*'s ſublime attention. He aſpires at ſomething *intirely new*, at being found an *original*: and, here, indeed he has ſucceeded, in ignorance, error, and obſtinacy.

5. He ſeems ignorant that *alum* and *iron*, in ſolution, give a green with ſyrup of violets, as is ſhewn in the ESSAY on Waters. But he afterwards finds out his miſtake, and yet does not amend.

6. He ſeems to confine the curdling of milk, to what he chooſes as obſtinately as inelegantly to call *calcarious nitre*, a natural bitter purgative ſalt; whereas, the union of the vitriolic or muriatic acids to moſt abſorbent earths or alcaline ſalts, in certain quantities, produce the ſame effect. See the ESSAY on Waters.

7. He repetes an error, eſpouſed in the preface, and heretofore expoſed, p. 14. 16.

8. He tells us, *The ſparkling and ſtinking of the ſediment on the red hot iron ſhew ſulphur.* I ſhould be glad to learn from this *chemiſt* of *profound ſagacity*, what *combuſtible matter* is not, according to this definition, *ſulphur?* It is ſayed by ſome of our *adepts*, that *flatulencies* eſcaping at the extremity of the *rectum*, exploſions that paſs for wit and humour in ſome companies, always burn *blue*. This muſt ſurely then be the flame and fume of brimſtone: for, beſides *ſparklings*, or *crackling*, and *ſtinking*, the *Doctor*'s ſole *criterions* of *ſulphur*; this *ventral fume* burns blue, which is another characteriſtic of brimſtone. If I did not fear frightening the *Doctor*, with naming this dangerous, diabolical combuſtible, and ſetting fire to it too near him, I would recomend to him the repetition of this curious experiment, if he finds his diet the ſame with that of him, on whom Van Helmont firſt made it. And, I would alſo tell him, that, let his food be what it will, he daily emits or ejects brimſtone, ſuch as he here deſcribes. To prove this, agreeable to the experiments of Bolduc and others, let him but take and dry the renal or alvine excrements of his own or any other human body, and throw them upon a red hot iron; and, if he carries not ſomething more angelic, than I can ſee about him, he will ſee *ſparkling*, hear *crackling*, and ſmell *ſtench*, enough to aſſure himſelf, he daily generates and voids plenty of ſulphur, according to his own definition, in a *method* as *intirely new*, as his *ſynopſis* or his *concerto* of experiments recorded in *blank* tables.

In the 8th page, we have *further obſervations upon the matchleſs tables*, and continued to p. 14. now and then quoting them as if they had been clear and complete. Surely, it muſt be the fault of the printer, that they are blank. In theſe, we find a ſtrain of the ſame kind of experiments and obſervations, till we come to his terreſtrial matter in hard waters, p. 11. where he lumps the terrene matter, taking it altogether for *calcarious.* Whereas the Essay on Waters ſhews, in the terrene reſiduum of all waters, ſome portion of *ſelenite.* Here again, the *Doctor* makes a *miſtake,* which he ſeems univerſally to adopt for *truth.* He ſays, p. 12. that this kind of *ſediment emits a pungent ſmell when rubbed with ſal ammoniac,* and *turns red or yellow with the ſolution of mercury ſublimate;* which he lays down as the *properties* of *limeſtone.* Now, the reverſe of theſe random poſitions is received and aſſerted by all authors that pretend to any degree of accuracy or preciſion in judging or ſpeaking: for, neither this kind of earth, nor any other lime, emits *any ſmell,* or receives *any color,* with the ſalt ammoniac or the ſublimate. But *theſe* ſuffer *thoſe* changes, upon the admixture of *calcarious earths,* as well as of fixed *alcalies.* The *Doctor* is not altogether ignorant of this truth: but, had he not placed it in this light, he muſt have fallen ſhort of what he aims at, and promiſes in his titule page, a *method intirely new:* in which he *thus,* and *thus onely,* ſuccedes.

In p. 12. he calls all theſe palpable inconſiſtencies and abſurdities, *principles.* Let him call them *his principles,* I ſhall not diſpute the phraſe, with this imaginary *adept* in *hydrochemy.* Here again, he calls *metallic ſolutions,* as well as *alcaline ſalts, precipitators;* which has been already expoſed, p. 13, &c. Then, he attempts to explane their effects, in a manner very unlike the preceding authors; ſee the Essay on Waters; indeed, in a method peculiar to himſelf. To give a perpetual apology for declining to cite the author's own words, the following ſpecimen of the clearneſs of his ideas and phraſeology is offered. ' Oil of vitriol, a heavier acid, being added to ſaltpetre or marine ſalt, *expels* the acid out of each of theſe ſalts, *raiſing it up* in the form of a vapour, whilſt the oil of vitriol unites itſelf to the terreſtrial matters of the ſame ſalts, and ſo forms the nitrum vitriolatum and ſal catharticus Glauberi.'---How ſhall the author of a large quarto volume, on which he ſpent *twenty-one years* of the beſt of his life, be ſuppoſed ignorant of the unjuſt expreſſions, and even falſe poſitions in this phraſe? If he were not particularly ſtudious of a *new method*, he would have ſeen, from a preceding author, without excelling whom, it was but an impoſition on the world, to publiſh a work on the ſame ſubject; he muſt have ſeen, when the ſtrong vitriolic acid is added to ſaltpetre or ſea ſalt, that the ſtronger attraction, between the heavier acid, and the alcaline baſes of theſe ſalts, than between theſe and their lighter, ſpecific acids; cauſes a violent commotion and attrition, with conſiderable heat; upon which conflict, the volatil acids, being detached from their proper baſes, are ſet at liberty, and fly off, or are propelled by the general commotion and heat, manifeſting themſelves, the one in red, the other in white, ſubtil, ſharp, acid fumes or vapors. What has this to ſay to *expelling and raiſing up*, the Doctor's favorite phraſes? Then, he does not ſuccede more happily in his notions of the alcaline baſes of theſe ſalts being a terreſtrial matter: the one is an artificial, a vegetable, fixed alcali; which can no more be called an earth, than other ſalts, particularly alcalies, with great ſubmiſſion to the learned *Doctor*. Hence, the union of the vitriolic acid to this alcaline ſalt gives the ſalt, commonly called, ſal enixum, tartarum vitriolatum, or ſal polychreſt; the very mixture above mentioned, ſhewing the impoſſibility of vitriolating nitre, which is decompoſed upon contact with the vitriolic acid; conſequently the author's *nitrum vitriolatum* is a *non-entity*. As to the baſe of the ſea ſalt, it is the native, the mineral fixed alcali; the union or ſaturation of which, with the nitrous acid, gives quadrangular nitre, and with the vitriolic acid, the purging ſalt, called after it's inventor, *Glauber*, analogous to the native vitriolate purging ſalt, which the *Doctor* affects to call *calcarious nitre*, confounding waters, with this impregnated, with the waters called nitrous by all the preceding writers; and that onely becauſe the abſurdity and confuſion of the appellation is expoſed in the *Eſſay* on Waters. Who will diſpute the *Doctor's method being intirely new?* None, that reads the ESSAY on Waters, in which theſe diſtinctions and explanations are ſupported by fair and familiar experiments.

In the ſubſequent paragraphs of the ſame page, he makes a moſt unſucceſsful attempt to explane the precipitations of metallic ſolutions upon mixture with water. He expreſly ſays, that when a ſolution of ſilver is added to a water, impregnated with ſea ſalt, that the terreſtrial matter in the ſalt is partly the cauſe of the precipitation and partly itſelf precipitated. The ignorance of this man, is, in this particular inſtance, rendered moſt unpardonable, by his impoſing an expenſive maſſive work upon the public, by which the unwary muſt be led into equal ignorance and confuſion.

His palpable miſtake in this point ariſes from having learned, that abſorbents and alcalies precipitate metallic ſolutions, and not having learned, that certain acids in ſome inſtances produce a ſimilar, not the ſame, effect. If the *terreſtrial matter*, as he calls the *alcaline baſe* of ſalt, be the *precipitant* of ſilver in this inſtance; how comes it, that the *acid* of the ſalt, ſeparate from it's baſe, and likewiſe the *vitriolic acid*, *precipitate* ſolutions of ſilver, quickſilver, and lead?

Moreover, the *Doctor* ſhould have been inſtructed, that the precipitation of ſilver in ſalt water is ſo far from containing any part of *his* terreſtrial matter, that this precipitate, as well as that made by the pure acid alone, is a pure union of the muriatic acid, by the force of attraction with the white metals, with the ſilver, as it is with the lead and quickſilver; by which union, *luna cornua*, *ſaturnum cornuum*, and *cryſtals* of quickſilver, capable of forming *mercury ſublimate*, are produced; not upon Dr. *Rutty's principles*, or in his *new method*; but in the manner explaned in the IDEA of ſalts and other parts of the ESSAY on Waters; by which, the *Doctor* would not always chooſe to be ſet to rights.

In the ſame manner and breath, the *Doctor* accounts, alike ingeniouſly and truly, for the precipitation of lead, alum, and lime water, or as he chooſes to call it, *the precipitation occaſioned by theſe his precipitators*, in any water. The *Doctor* ſhould have learned, that though theſe acids precipitate ſilver and lead, they neither do, nor can precipitate the earths of alum or of lime water; unleſs the generation of a *ſelenite* with the *vitriolic acid* and the *abſorbent earth* in this water, may be, according to the *Doctor's principles*, a precipitation. But, he has ſomeway acquired a curious notion of lime; in which, he ſays, *the particules of fire united to the ſtone are analogous to thoſe of an acid.* How true this may be, is eaſily judged by thoſe who know, that by the common conſent of all authors, even to the experience of apothecaries' aprentices, lime is found ſo far from an acid, or even a neutral ſtate, that it ſtands the principal teſts of the moſt cauſtic, fixed alcalies.

In p. 13. among other obvious inſufficiencies and abſurdities, he gives the melting and bliſtering of the ſalts or reſidua of waters upon a red hot iron, as proofs of their containing the native purging ſalt, his calcarious nitre. Yet, almoſt all known ſalts melt, and borax and alum, as well as this, melt with bubbles or bliſters. In the 9th articule, in this page, he ſays, *ſome of the hard waters ſeem to contain a ſmall quantity of the native alcali or natron, with the* other *neutral ſalts! Alcalies* are here *neutrated*, by the *Doctor*'s pen! The proof of the fact is a contradiction to his blunder in the preface, p. 12. and both a miſtake. That the *reſidua and ſalts of ſeveral waters cauſe an urinous, pungent ſmell on mixing with ſal ammoniac*, is notoriouſly true. But, it is as good proof of a calcarious earth, as of a fixed alcali; eſpecially as he aſſerts, that ſalt of tartar, as well as ſalt ammoniac, produces this effect with theſe reſidua and ſalts, which proves ſuch reſidua either ammoniacal or calcarious. Who, beſides the author, would attempt to draw inferences from ſuch innaccuracies? ſuch groſs errors?

It would be endleſs to trace out the laborious author through the numberleſs irregularities and perplexities of the remainder of the firſt book. All, that can be called *his own*, are but ſome examens of common waters, made upon the *principles* before expoſed: the reſt is collected from different authors. And I will be confident, there is nothing, within the rules of phyſic or chemiſtry, in all this, that is not more fully and conciſely layed down in many writings, the *Doctor* does not chooſe to cite, particularly the laſt publiſhed, the ESSAY on Waters.

His fondneſs for a poetic deſcription, with it's falſe jingle and miſtaken notions, inveloped in ſoft, unmeaning ſounds, is very remarkable: for, in a *corollary*, p. 41. he ſeems pleaſed with a poet's calling ſnow by the phantaſtical, inexpreſſive name of, ‘woolly rain,’ and onely contradicts his ridiculous notion of, ‘ſecret nitre lurks within.’

After having thus diſagreeably waded through the firſt book of this maſſive work, we come now to conſider the ſecond. I ſhall be as brief as poſſible with his natural hiſtory, becauſe, bad as it is, it belongs to ſomebody elſe, which he either cites or ſuppreſſes, as he thinks fit.

He begins this book with a chapter on modern nitre or ſaltpetre: he attempts to draw it's characters, p. 51. Let his criterions of this ſalt be compared with thoſe of the ESSAY on Waters, part II. p. 99 to 100. part I. p. 122, 123, &c. and let judges determine which is moſt conſonant to reaſon and truth.

But, how far the Doctor's experiments on this ſubject may be relied on, is to be judged from the following unfortunate *ſcholium*: *The terreſtrial matter in ſaltpetre is ſo cloſely combined with the acid, as not to be ſeparable by the admixture of any alcali: for, that ſaltpetre contains a conſiderable proportion of terreſtrial matter, appears from the magneſia alba, one of the methods of preparing which is from ſaltpetre.*— Sure, if this great author had had one phyſical friend in Ireland, that would have read his manuſcript, ſuch an enormous blunder as this could not have been permitted to come to light. Yet, there were not wanting here, men that upon peruſal puffed the performance, as a *library book*, as much a ſtandard, with reſpect to *waters*, as the works of HIPPOCRATES, with reſpect to *phyſic!*

There is not an apothecary ſo ignorant, in Dublin, as not to know that *ſaltpetre* conſiſts of a *ſpecific acid* and an artificial, *vegetable fixed alcali.* No man, that knew this, could attempt to precipitate any thing from a ſolution of ſaltpetre, with any, and leſt of all with a fixed, alcali. Pure *nitre* or ſaltpetre, which alone is to be called nitre, contains *none earth:* it is compoſed of the two ſalts above, the one an *acid*, the other an *alcali:* and none increaſe, none exceſs, of either can cauſe any degree of *precipitation* in a *pure ſolution.*

But, our wonderful *doctor* ſays, it contains a conſiderable proportion of *terreſtrial matter*, and proves it by the making *magneſia alba*. Aſtoniſhment! Nitre is generally at firſt formed upon the union of it's ſpecific acid with an abſorbent earth, in old walls and other fit earths. This is crude, immature, nitre, not *Rutty*'s nitrum calcarium; and bears but little relation to ſaltpetre, till it's baſis be changed by ſubſtituting an alcaline to a terrene one. In this operation, all that was terrene is precipitated; ſo that *pure nitre* or ſaltpetre knows *none earth*. Indeed, in cryſtalliſing the ſaltpetre, a liquor remanes, called *mother* or *ley of nitre*, which will not run into cryſtals. And this ariſes from ſome remanes of earth, unprecipitated, for want of a ſufficient quantity of fixed alcali, united with the acid. The proof is, take this ley and pour into it a ſolution of a fixed alcali; the doctor's *terreſtrial matter*, the *magneſia alba*, will be precipitated, the nitrous acid uniting with the body with which it has the ſtronger attraction, the fixed alcali, forming with it complete nitre, free from all terreſtreity. This is known to the mechanical workers in ſalt-petre. Yea, it is the method of purifying ſaltpetre, taught by *Boerhaave* and others. But Dr. *Rutty* chooſes a *method* of his own, as *new*, as falſe.

The firſt and ſecond chapters of the ſecond book are taken up with an unproved diſquiſition, and unexplaned, inconcluſive experiments, on the nitres, of which he makes three kinds, 1. modern nitre or ſaltpetre; 2. antient nitre or natron, the native fixed alcali, which he aſſerts to contain a volatile alcali; and 3. mural or calcarious nitre, which he does not diſtinguiſh from the crude or immature nitre, that which wants but an alcaline, inſtead of a terrene baſe, to prove it ſaltpetre. And this his calcarious or mural nitre, thus diſtinguiſhed, paſſes with him for real nitre: for, he every where gives the epithet of nitrous to waters that contain onely the native vitriolate or purging, bitter ſalt, explained in the ESSAY on Waters, part II. p. 100, &c. And in this, he muſt be confeſſed *intirely new:* for though LISTER broached the error, and ſome inconſiderate, indeed inconſiderable, writers have followed him; none has been hardy enough to carry the abſurdity thus far, but Dr. *Rutty*.

The third chapter is taken up with an examen of ſeveral purging ſalts; ſuch as, 1. factitious Epſom ſalt; 2. Glauber's ſalt; 3. ſal polychreſt; 4. the neuter ſalt in potaſhes; 5. vitriolate tartar; 6. the diuretic ſalt; judging them, as I muſt ſuppoſe, to make conſtituent parts of ſome mineral waters: a notion in which the *doctor* appears an *original*.

Now, follows the detail of waters, p. 84, beginning with *the nitrous*, at the head of which, *Epſom* water is placed, becauſe the *doctor* finds it contains the native, purging ſalt; bearing no ſort of relation to the antient or modern nitre; and ſome abſorbent earth; while, by the ESSAY on Waters, it is ranked onely among ſaline waters, of the ſimple neutral, purging kind; part II. p. 95, and proved to conſiſt of the native vitriolate or purging bitter ſalt, conſiſting of the vitriolic or univerſal acid and the baſis of ſea ſalt, Dr. *Rutty*'s nitre; a portion of the muriatic acid, charged with calcarious earth; ſome abſorbent earth; ſome ſelenite, and ſome oily matter, p. 98, 99. What jarring with other authors, what confuſion in terms, muſt this denomination of *nitrous* produce, if Dr. *Rutty*'s work ſhould get any footing? It is obſervable, that this is one of the many waters, which the *doctor* never ſaw at the ſource.

The next water he gives an account of, is that of *Sedlitz* in Bohemia; which, having never ſeen it, he is forced to take upon truſt, and that moſt imperfectly

perfectly from an other author. See the characteriſtics of theſe ſalts, ſet forth by experiments, in the ESSAY on Waters, p. 100, &c. and judge of the *Doctor*'s regard to truth and juſtice.

In this claſs of nitrous waters, the *Doctor* gives us thoſe of *Stoke*, *Acton*, *Pancras*, *Barnet*, *North-Hall*, *Holt*, *Moreton*, *Kinalton*, *Comner*, all in *England*; but by the *Doctor*, for the greater *exactneſs* and *novelty*, no doubt, analyſed in *Ireland*: to theſe, he adds *Carrickfergus* purging water. After which, he adds ſome incomplete tables, as in the firſt book, with obſervations upon them, as erroneous as upon thoſe: for, p. 106, he talks of a white ſediment, precipitated *from the waters*, not onely by *alcalies*, but by the *ſolutions* of *ſilver*, *lead*, &c. which is heretofore expoſed, p. 12, 13, &c.

This book is moſt unaccountably divided: after chapters I. II. III. are enumerated, then begins a new enumeration of chapter I. at p. 84, and ſo runs on to Nº XII. p. 105. Then begins, Chap. I. Of *nitroſo chalybeate* waters. The example, *Scarborough*; the analyſis taken from doctors *Short*, *Shaw*, *Allen*, and the author, in *Ireland*; omitting the *volatil ſteel*, *iron*, or *vitriol*, aſcribed to it by ſome of theſe writers. In this correction, has not the neglected ESSAY on Waters had ſome ſmall ſhare? The *Doctor* is too *modeſt* to own it.

To this claſs, he adds the waters of *Malton*, *Cliff*, *Tarleton*, *Kirby Thower* or *Thore*, *Hartlepool*, *Orſton*, *Paſſy*, *Egra*; ſo completes chapter VIII. with waters never ſeen by their examiner, and taken onely upon truſt from different authors, of no better fame than the *compiler*. Chap. IX. enumerates the virtues of theſe waters, upon no better authority.

And, on p. 123, begins Chap. I. Of *nitroſo-ſulphureous waters*; that of *Croft* is given for a ſpecimen; in which, there appears no proof of ſulphur, but a putrid ſmell; which is ſhewn to be no teſt,

in

in the ESSAY on Waters, particularly on thoſe of *Aken* and *Bath*.

To this is added, under the different denomination of *nitro-ſulphureous*, the waters of *Upminſter*, *Shapmoor*, *Newland*, which ends Chap. IV. And then begins again, Chap. I. with the titule of *Nitroſo-ſaline waters*, the examples of which are the waters of *Alford*, *Cheltenham*, which in the ESSAY on Waters, part II. p. 104, is ſhewn to be a *neutral, purging chalybeate*; and *Sydenham common*; all of which, the *Doctor* takes upon truſt, never having examined one of them on the ſpot. Thus begins, continues and cloſes Book II.

The third book is introduced with an account of *ſalt*, as an ingredient in the mineral waters, which all accurate writers make the *head* of all *ſaline* waters, as it is the moſt common and abundant in the creation, making a component part of all known waters, in ſome degree, and being the baſis of many mineral waters, the cauſe of the ſaltneſs of the ſea, as well as of certain ſalt ſprings, rivers and lakes.

In all this hiſtory, the *Doctor* is extremely defective, compared to the ESSAY on Waters, part II. p. 28 to 92. One thing appears however quite the author's own and *entirely new*; where he tells us, *that* ſea ſalt *ſeems to be preſent in moſt or all the ſalts prepared by incineration and lixiviation from vegetables.* For proof of which, he obſerves, *that to the* ſea ſalt, *the growing moiſt of fixed alcaline ſalts in the air is to be aſcribed.* This he inſiſts on further, p. 141, p. 144. Who will diſpute this *poſition*, equally *new* and *falſe*, with our author?—I ſhall not: let him enjoy the honor, wholely and ſolely. In all the reſt, there is nothing new; and the whole falls extremely ſhort of the account of muriatic ſalts in the ESSAY on Waters; with which, the *modeſt Doctor* would not be ſeen to make free, before company.

Chapter II. p. 146, treats of *ſea water*; let us ſee if our author has ſtruck out any and what new things, under this head. He ſets out with complaining of the public's having but little in the way of analytical accounts of ſea water: in which he is as juſt as in the preceding; for no water has been more fully and fairly conſidered and analyſed. See the Essay on Waters.

In reciting the ſenſible qualities, p. 147. he aſſerts *ſea water* to be *green* or a mixture of *blew* and *green*. If this were true, he ſhould have ſayed, a mixture of *blew* and *yellow*, in which the former predominates. But, the fact is, pure ſea water has no color, and the different colors aſcribed to it, are derived from the veſſel in which it is contained. See the Essay on Waters, part II. p. 48.

He confeſſes, that by putrifaction, it becomes as fetid as the ſulphureous: indeed, it becomes actually a ſulphureous water, in the *Doctor*'s ſenſe; for, he does not prove his having any where ſeen any other ſulphureous waters, than the creatures of putrifaction. See the Essay on Waters, and the ſequel of *this great* work.

But, p. 148, from *putrifaction*, he attempts to prove the *ſulphureous* qualities of *ſea water!* Why does he not prove it *ſulphureous* in the *natural ſtate?* If every water is to be deemed *ſulphureous*, that grows *fetid*, and then diſcolors ſilver, I ſhould be glad the *Doctor* would ſhew a water, any way *impregnated with ſalt*, that may not become, in his ſenſe, *ſulphureous*.

In p. 149, he gives ſea water, *tartar*; but ſays, it contains *leſs tartar* than ſome petrifying waters. Here, let the *Doctor* enjoy due praiſe: for, he is ſurely the firſt good naturaliſt that found *tartar* produced in the ſea, or in petrifying waters, or even any where, but in wine. But, why ſhould not a man, of the *Doctor*'s parts, chooſe whether this ſhould be given to Bachus, to Venus, or to both. To me, the *Doctor* appears one of thoſe that might be allowed to change the ſituation of the heart, or reverſe the circulation of the blood, without contradiction; had he not committed his abſurdities to writing, and that under the ſanction of ſome great men.

In his *corollary*, p. 151, he aſſerts, but without any proof, that *ſulphur* and *bitumen* make conſtituent parts of *ſea water*; while the Essay on Waters teaches us, from convincing experiments and fair obſervations and inferences, that ſea water differs accidentally, not eſſentially, from the waters of ſalt ſprings; each, when pure in kind, affording the ſame ſolid contents, a *calcarious earth*, a *muriatic ſalt*, a *ſalt ley*, which gives a *bitter purging ſalt*, with a ſmall portion of the *oily matter*, common to all waters; but *no ſulphur*, *no bitumen*, *none unctuous ſubſtance*. After which, a comparative analyſis, of the ſeveral contents of the ſalt waters of ſprings and the ſea, is given: by which they appear clearly to agree, part. II. p. 54, 55, &c. But this was of no weight with the *Doctor*, though he could not contradict the facts.

After thus going moſt deficiently through his *ſaline*, by which the author means *ſalt waters*, ſo far is he from offering any thing *new* or clear of *his own*, that he does not give what he may from others. He forms a new ſubdiviſion, Chap. III. Of *ſalino-nitrous waters*; that is, of waters conſiſting of *ſea ſalt* and the *purging bitter ſalt*, of which, the ſea is no where found free, upon analyſis. See Dr. Speed on ſea water, and the Essay on Waters.

The examples of this kind of water, he received at Dublin, without having ever ſeen the ſources, are from *Barrowdale*, *Leamington*, *Witherſtock*, *Rougham* or *New Cartmall*, St. *Eraſmus*'s Well, *Caergyrle*, *Stretham*, St. *George's Spaw*, *Dulwich*, *Weſt-Aſhton*, *Eaſt-Chenock*; then ſome in *Ireland*, as at *Carrickfergus*, *Kilroot*, *Maherebeg*, and *Dublin*, ſome of which laſt he ſaw. Chap. IV. treats curſorily of ſome foreign waters of this claſs, without diſcovering any thing new, indeed taking moſt upon truſt; except in Dublin waters, which he analyſes, in his manner; but in a way peculiar to the whole work, without explaning, or drawing the fair and neceſſary inferences from, any of his experiments; though he here and there marks out corollaries and ſcholia. And, in a note, p. 178, he gives us a diſcovery, which cannot be diſputed with him, the *ſeparation* of it's *earth* from *Briſtol* water, cloſely bottled, in ſome years. I have ſeen it, that has been kept without any viſible change, but loſs of heat, upwards of twenty years: and am ſure, many may be called to atteſt this truth. The failure then, muſt have been in the bottling and ſtopping, not in the water.

The next claſs formed, is under Chap. V. *ſalino-chalybeate* waters; though he paſſes over almoſt all the ſalt ſprings, under the claſs of ſimple ſaline, while he mentions their impregnation with iron.

The examples of theſe *ſalino-chalybeate* he gives, are in the waters of *Stanger*, which he alſo judges *nitrous*; in thoſe of *Filah*, *Cawthorp*, *Gallway*, *Conſtadt*, none of which he has ſeen, but gives their analyſes, as well as their virtues and uſes, from others, in his *uſual manner*.

And now, he comes to form an other claſs, Chap. VI. *Salino-ſulphureous waters*. He begins with *Harrigate* water, which he calls, the *ſtrongeſt ſulphur* water in Britain, and ſpeaks of the ſuperior ſtrength of it's *impregnating ſulphur*. Yet, is he not able to give a ſingle experiment to prove it *more ſulphureous*, or in any manner *impregnated* with *ſulphur*, than the *bilge water* of a ſhip, *ſea water* lying in a caſk, or even in a bottle, not quite full, or by any other means *rendered putrid*. And by the remaining part of his own analyſis, it appears, that the ſalt and earth it yields are the ſame in all reſpects with thoſe of the other ſalt ſprings; all of which, upon ſtagnation *putrify*, and become as *ſulphureous* as *Harrigate*, or any other of the *Doctor's ſulphur waters*.

But this matter is ſet in the cleareſt light in the introduction to the Eſſay on Waters, part II. p. 5. in treating of *phlogiſton*, as well as of the *ſalt ſprings*, and the waters of *Aken* and *Bath*, where this miſtaken notion is expoſed and exploded. If this were true, a lover of truth would pay it ſome regard; if falſe, he would expoſe it. But, Dr. *Rutty* overlooked or could not comprehend it: or like *Sangrado*, he wrote a book upon the ſubject, which he muſt maintain, whether right or wrong.

In the ſame claſs, he enumerates the waters of *Maudſley*, *Crickle*, and *Braughton*, upon no better principles. Then, gives ſome incomplete tables of his *concerto* experiments, and concludes the third book with giving the virtues of the like waters, from his celebrated *coadjutor* Dr. *Short*.

He is at a loſs to account for the *ebullition*, which he calls *fermentation*, in Spa waters, upon the adding of an acid, and infers, that the ſeveral changes in theſe, with various mixtures, indicate the *exiſtence* of an *acid* and an *alcali*, at once, unaltered, in theſe and other ſuch like waters. Compare this to the analyſis of the Pouhon water, in the ESSAY on Waters, and ſee how attentive Dr. *Rutty* is to the calls of reaſon and truth.

He endeavours, p. 212, to diveſt all waters of the character and titule of *acidulae*, but the *vitriolic* and *aluminous*. The eſſence and nature of a volatil vitriolic acid, and it's exiſtence in various waters, are demonſtrated in the introduction to the ESSAY on Waters, § 38, &c. as well as in the analyſis of the waters of Spa and Stavelot, as well as of Aken and Bath.

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From the laſt cited, to the 219th p. is taken up with fragments of the natural hiſtory and analyſis of *alum*, collected from various writers. From ſome of theſe, he has learned, what neither they or he can prove, that the *baſis* of *alum* is *lime* or *chalk*, and that an *artificial alum* may be made, with *theſe earths*, as well as with *potter's* or *tobacco-pipe clays*, and other *non-abſorbent earths*, p. 215; when any known abſorbent earth is diſſolved in the vitriolic acid, the reſult is proved experimentally to be, not *alum*, but *ſelenite*: And none but abſorbent earths are ſoluble in any acids. See the ESSAY on Waters, General IDEA of Salts, &c. the ſight of which would chagrine this wretched, injudicious, immethodical *compiler*.

After this, comes a new head, marked again Book IV. *Of the vitriolic and chalybeate waters*; with an introduction of 45 pages, ſeemingly divided into parts, and numbered I. II. III. But upon examination theſe appear onely as a kind of heads to the diſcourſe. The firſt is not diſtinguiſhed, the ſecond and third are.

He tells us, p. 220, as an *important obſervation* of BOERHAAVE, that there are but *two vitriols*, the *martial* and the *venereal*. To do juſtice to the great, reſpectable name, we ſhould be told where Boerhaave ſays thus; and the more, as it is falſe, whoever ſays it. Is there not a vitriol of *Zinc*, as common as either of the others, in Germany? The ESSAY on Waters ſhews how we may have a twofold ſolution of *Zinc* in the impregnation of waters, part II. p. 25. And this metallic may alſo impregnate water by the means of alcalies, as well as of acids. But, it was not conſiſtent with Dr. *Rutty*'s ſchemes to take notice of this; or, it was beyond his comprehenſion: though he afterwards produces *white vitriol*, not knowing what it is.

After this, he ſets out to give us the hiſtory of *vitriols*, and the *ores* from whence they are drawn; and after reciting a number of ſofter minerals, perhaps decompoſed pyrites, or other martial earths; he comes to the pyrite, whoſe property of ſtriking fire with ſteel, he aſcribes to this mineral's abounding in ſulphur. If this be the cauſe, how comes the agate and the flint, in which he will hardly ſhew any ſulphur, equally capable of giving fire by percuſſion with ſteel? In the ſame paragraph, he confounds *chalk* with *ochre*. Sure, all this will be allowed *intirely new!*

He ſeems throughout this part to exult at ſhewing, as he imagines, more *ores* of *vitriol*, beſides the pyrite. What proof can he offer, that his *calcantha*, *bolar earths*, *martial earths*, *black* or *Iriſh ſlate*, that eſpecially with ſhining yellow particules intermixed, are not *pyrites*, reduced or decompoſed by fire or by time, air, and water? It is moſt certain, that moſt pyrites may be brought by theſe means, to thoſe forms.

Though, at ſetting out, he denied the exiſtence of more than two vitriols, he forgets himſelf, p. 231. and gives us the third, the *white vitriol*; of the nature of which he appears totally ignorant.

He procedes, p. 231. to make comparative experiments on the common green or *martial vitriol* or *copperoſe*, *white vitriol*, and the *ſalt of ſteel*, which ſhould be but a purer *martial vitriol* than the common. But, ſee the ignorance of the experimenter! See his judgement in the choice of materials for his experiments! He tells us, *the ſal martis was much like the green vitriol in taſte, but ſomewhat more acid.* Every apothecary's aprentice would have told him, theſe two, equally pure, were one and the ſame thing, in ſenſible qualities, as well as properties and effects. But, that if there were any difference, the *ſal martis* ſhould have been the more ſweet or leſs auſtere and nauſeous.

After a number of his *concerto experiments* on theſe three, more properly but two, vitriols; he never diſcovers what the *white vitriol* is; but ſeems to conſider it as *martial*. But, in one of his *ſcholia*, he aſſerts, *there is a little ſulphur in the Engliſh vitriol*.—See how happy he is in his proof: when iron is diſſolved in the vitriolic acid, the abundant phlogiſton of the metal forms ſulphur with the acid, and remanes in a black maſs, inſoluble in this menſtruum. This, our author does not know; but quotes *Cartheuſer* for a proof, that this black maſs is ſulphur.—Does it hence follow, that it muſt exiſt alſo in the vitriol? All metals loſe more or leſs of their inflammable principle in the act of ſolution. Thus, ſolutions of iron yield ochres onely, which is but a martial earth. Vitriol then, which is metal thus diſſolved and cryſtalliſed, muſt be void of phlogiſton, void of ſulphur, in every ſenſe.

He at length finds, p. 235. that *martial vitriol* changes ſirup of *violets* to a *green*. And, to ſupport his aſſertion in the preface and elſewhere, that this may be the effects of an alcali; he here aſſerts, that *acid and alcali both exiſt together in the ſame ſubject*; looking upon the *iron* as an *alcali*. What apothecary would not reprehend his aprentice for ſuch amazing ignorance? And yet the ſucceding experiment proves the acid quite blunted; ſo that this notion appears, in all reſpects, ridiculous.

At length, p. 236. he comes to ſee what colors his vitriols ſtrike with galls. And, to certain quantities of a ſolution of each, of different ſtrengths, he adds a certain weight of the *powder* of galls; not ſeeming to know that a clear *infuſion* of galls, in deſtilled water, would enable him to ſee the changes, without the interruption and confuſion which the powder muſt cauſe. To the ſolution of the white vitriol, he adds two drops onely of tincture of galls; but why, or with what this tincture is extracted, are yet ſecrets!

But, what are we to learn from all theſe *dyings?* In the laſt paragraph of this page, the *Doctor* tells us, that *white vitriol* is *preferable* to the *green* for making *ink*. Believe it who will. Though Goſlarian vitriol of zinc ſtrikes a blue or black with aſtringent infuſions, it does not give ſo deep a dye as the martial vitriol. Moſt authors that have attended to this blackening of galls with the white vitriol, have from this alone concluded, this vitriol to be martial, giving it the epithet of immature*. But our ingenious *Doctor* goes further, and in a note aſſerts, that *alum as well as iron, is the baſis of white vitriol, which contains above half alum to the vitriolum martis.* Good *Doctor*, what is your proof? The white vitriol of the ſhops conſiſts of zinc and copper, diſſolved in the vitriolic acid. This is diſcovered by deſtillation, which extractsthe acid, eaſier than from the martial vitriol. This white vitriol is ſoluble in volatile alcalies; the property of vitriol of zinc. But, that it contains ſome copper, appears by ſetting a clean plate of iron in a ſolution of the vitriol, or even by rubbing the blade of a knife wet, with a bit of the vitriol; by which the parts of the iron, brought into contact, will be covered with copper, as from the ſolution or vitriol of that metal: from the ſtronger attraction between the acid and the iron, than between that and the copper.

Hitherto, we have been wading through the firſt part of the introduction. Now we are come to the ſecond, *Of chalybeate waters*, p. 241. Under this head, he attempts to account for ſome chalybeate waters retaining their metal longer in a manner capable of tinging with galls &c. than others. And after much pains and circumlocution, he is forced to aſcribe it to the different degrees of impregnation, ſuppoſing that which is more ſtrongly charged, moſt likely to preſerve it's tinging quality the longeſt, p. 242, 243, 244.

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* Geoffroy. mater. medic.

If the *Doctor* had the proper diſpaſſionate regard to truth and right reaſoning, without the violent affectation, he univerſally ſhews, to treat all his ſubjects *in a method intirely new*; he muſt, from the Essay on Waters, have learned a more ſimple, familiar method of explaning theſe, to him, perplexing phaenomena. He might there have learned the powers and properties of ſolvents, and ſeen that the permanence or fugacity of the tinging quality in water muſt depend upon the fixity or volatility of the menſtruum, by means of which the water becomes impregnated with iron.

The ſlighter the impregnation, the paler the color ſtruck in chalybeate waters; and the more volatile the ſolvent, the ſooner will the diſſolved metal be pricipitated. To prove this, let it be obſerved, that moſt of the chalybeate waters of theſe kingdoms are ſo ſlight an impregnation, that their tinging quality is ſoon loſſed. The Spa and Pyrmont waters, being ſtronger impregnations, retain their tinging quality longer and better. But, even theſe loſe it upon lying ſome time expoſed to the open air as well as by heat. Whence, ſome have imagined the whole tinging part, the iron or vitriol, *volatil*, and *fled*. This gave the notion of *volatil iron*, *ſteel*, and *vitriol*, ſo juſtly exploded in the Essay on Waters. But, that the permanence of the tinging quality depends ſolely upon the fixity of the ſolvent, appears from the following conſiderations:

1. Let half a pint of Spa water, be expoſed, in an open mouthed glaſs, to the air.

2. Let about a drop of the diluted acid, called ſpirit of vitriol, be dropped into half a pint of the

ſame

ſame Spa water. Let this be alſo expoſed, in another open mouthed glaſs, to the ſame air.

3. And let the pure vitriol of iron, in the proportion with which the Spa water is impregnated, be diſſolved in the like quantity of pure water, and ſet in the like glaſs, and ſame air, with the 1ſt and 2d.

The reſult of this will be, that the firſt will in the time mentioned, in the ESSAY on Waters, grow turbid, throw up a diverſicolored pellicule, and let fall an ochrous ſediment. Upon which it will loſe it's purple tinging quality. Whereas the ſecond will retain it's limpidity and tinging quality for ſeveral days after the firſt has loſſed it, and the third will do the ſame. Moreover, when the waters of Spa, Pyrmont, &c. have loſſed, by time or ill corking, their tinging quality; it is readily reſtored by adding a ſufficient quantity, but no more, of what the water loſſed, an acid. All this is fully and clearly explaned in the ESSAY on Waters, which the *Doctor*, for ſundry weighty reaſons, has choſe to overlook, not daring to hold ſuch a glaſs to his *Synopſis*, though he preſumed to promiſe it.

He likewiſe here, p. 243. ſhews himſelf quite ignorant of the true cauſes of the ebullition ariſing upon the dropping any acids into certain mineral waters. Which, with the eſſence and effects of the more volatil acid, in this experiment propelled, are fairly explaned in the ſame ESSAY. But in this, as in many other inſtances in this work, obſtinacy and pride appear more predominant in our author, than the love of truth or regard to the public or his promiſe.

By the firſt paragraph of p. 245. one would conclude, that the *Doctor* ſtudied to appear *abſurd* as well as *novel*, or that he preferred darkneſs to light. He obſerves, that it has been found by trials, that Spa and other chalybeate waters, taken up half an hour, tinge ſooner and deeper with galls, than when immediately taken from the ſpring. And this, he attributes to *the particules, by means of the contact with the air, forming themſelves into large combinations.* Now, this effect of Spa water expoſed to the air, as well as the cauſe of it, the fugacity of a ſubtil ſolvent, were firſt obſerved, and afterwards demonſtrated, by the author of the Essay on Waters, in many curious, ſimple, and concluſive experiments on the Spa waters, upon the ſpot. But, to keep up to his titule page, to be *intirely new*, it was neceſſary for the *modeſt Doctor* to overlook this, and avoid all means, as well as degrees of compariſon.

In the ſecond paragraph of the ſame page, he is wrapped up in the ſame perplexity, obſcurity, and error: not knowing in what ſeaſons the waters of Spa are ſtrongeſt and beſt. Yet this, had he an underſtanding head and an heart poſſeſſed of the love of truth, and open to conviction, he might have learned upon fair demonſtration, in the Essay which he would willingly ſuppreſs, of his abundant *modeſty* and *generoſity*.

After this, p. 246. he treats of *iron as an ingredient in mineral waters.* And in ſpight to all the authors he calls to his aid, appears as defective, perplexed, confuſed, and erroneous as elſewhere. He aſſerts, p. 246. that *iron has neither taſte nor ſmell.* He might as well have ſayed, it has neither color nor conſiſtency. Let any man rub iron or it's filings, and if he has the ſenſe of ſmelling, he muſt diſcover it's peculiar odor, as he does that of amber and the like, after friction chiefly, if not ſolely. Then, as to it's taſte, let but clean, comminuted, iron, filings for example, or a plate of clean bright iron be held a while in the mouth, and whoever does this, that has a palate, muſt be as averſe to truth as the *Doctor*, if he does not diſcover the peculiar, ferrugineous taſte. The reſt of the paragraph is of a piece. He chooſes to give iron, a large mixture of ſulphur, though with this mineral, the metal can not retain it's malleability. ESSAY on Waters.

Hence, however abſurdly, the *Doctor* deduces *ſulphur* in *chalybeate* waters; not knowing, that what he would have called ſulphur is loſſed in the ordinary action of ſolution, either flying off in fetid, inflammable fumes, or combining with the fumes of the acid and forming brimſtone, which is not ſoluble in the water. ESSAY on Waters.

He alſo ranks iron amongſt the abſorbents, becauſe it blunts it's acid ſolvents. He muſt eſtimate lead more than abſorbent; ſince it is known to ſweeten it's ſolvents.

After this, he gives the virtues of iron, collected from other authors. In all which, it would be but juſt, as well as modeſt, to lay no clame to elegance or order, more than to *novelty*. He particularly quotes *Ab Heers*, as a man of learning and judgement; becauſe he knew almoſt as little of chemiſtry, natural or artificial, as the *Doctor*; and for no better reaſon, than his making a ſolution of martial vitriol in water, or an infuſion of filings of iron, with the vitriolic acid, in water, a ſubſtitute for Spa water; which happily correſpend with the *Doctor's exalted* notions.

Let any man of common ſenſe, read the analyſis of the waters of *Spa*, in the ESSAY on Waters, and ſee what analogy this groſs ſolution of iron, in an heavy, fixed acid, can bear to that impregnation of water with this metal, by means of a moſt ſubtil, volatil ſpirit, to ſay nothing of it's other ingredients, of which *Ab Heers* knew not much more than *Rutty*.

He precedes, p. 249. to give *the virtues of chalybeate waters*; and, where he does not borrow or ſteal, but *attempts to be new*, he is erroneous and falſe, as elſewhere. He ſays, theſe waters *cool and temper*, i. e. attemperate, *the inordinate heat of the blood*. The principal caſe, in which no good practicioner ever preſcribed them. What he means by *animal ſpirits*, and their being *ſoothed* by chalybeate waters, I am not enough *gifted* with the *ſpirit* to conceive. But, as for their *curbing fermentations* and *flatulencies*, as he calls it, there can not be a greater miſtake: for, cautious practicioners always interdict the uſe of fruit, moſt vegetables, particularly the leguminous; becauſe with theſe, the waters cauſe flatulencies and cholics. And even without theſe, many are obliged to take carway comfits or ſome aromatics with the waters, to prevent their inducing flatulencies. This, the *Doctor* learned before he wrote, p. 256. for there, he *forbids flatulent diet*. Thus we ſee the *Doctor* ſhines as much in one branch of his profeſſion, as in an other: he makes juſt as good a practicioner, as he appears to be a naturaliſt, a chemiſt, and a philoſopher; and if he has any thing to boaſt of, it is conſtancy and uniformity—in error and obſtinacy.

In the remaning part, or wherever he goes, not alone, but in leading ſtrings held by others, he may be generally relied on; where he happens not to miſtake, an author, or to cite an unworthy one. Thus, he quotes *Baccius*, a compiler, almoſt as ignorant of all the rules of chemiſtry as *our Doctor*, and one who, like *him* alſo, treats of waters, *he never ſaw* in their ſources. Yet, with Dr. *Rutty*, ſuch a writer is ſufficient authority for the *diſſipation of ſtrumous ſwellings* by the *external application* of *chalybeate waters, made hot*. Whether *Baccius*, or *Rutty*, ſays this, I am not at preſent clear. But, all that have ſenſibly wrote on theſe waters, and all that have ſenſibly read ſuch writings, all know, that all *cold chalybeate* waters are *deſtroyed* by *warming*, long before they can become *hot*. But, he certainly has miſtaken his ſubject, and ſhould have taken a few years longer to correct theſe errors, for the accumulation of which, twenty one years were hardly neceſſary:

ceſſary: for, in p. 251. he lumps and confounds the waters of Spa with thoſe of Bath and of Briſtol, and ſays *theſe*, *indiſcriminately*, *extinguiſh the heat of the ſpirits raiſed by the bile*, &c. Had this man no one friend left to reſcue him from ſhame and confuſion? Sure, whoever aided or countenanced him, in this premature publication, muſt either be as ignorant as the writer, or not his friends. Behold their *ſtandard* of hydrochemical writings! See their HIPPOCRATES CHEMICUS!

But, the *Doctor* does not ſtop here: for, though a latin quotation, he happens to ſet at the head of p. 252. expreſly *forbids* the uſe of *chalybeates*, where the *hectic heat* is conſiderable, recommending *milk*, rather than *mineral* waters; yet, after, as well as before this, he perſeveres in recommending them, even in vomittings and ſpittings of blood. In which, I muſt be bold to ſay, he is *ſingular*; yea, I muſt confeſs, what he contends for, his practice of phyſic, as well as of chemiſtry, *intirely new*.

Nor is he leſs abſurdly *new*, when he recommends chalybeates for diſorders never attended with heat, dropſies; to cure which, the momentum, and of courſe, the heat of the blood muſt generally be increaſed. But, as this is the *Doctor's own practice*, I ſhall comment upon it no further, than to ſhew, that in the fourth paragraph of p. 253. he with his own hands, or perhaps thoſe of his reviſer in London, ſeconded by good authority, in a few lines overturns the preceding practice: for he ſays, *chalybeate waters are hurtful to thoſe whoſe viſcera are unſound*, *ſchirrhous*, *or broken*. *And forbidden in Dropſies*. Can there be a *preternaturnl heat*, a *vomitting* and *ſpitting of blood*, or *an extravaſation* of *ſeroſity*, when the bowels are *ſound*, *whole*, *and free* from *obſtructions?*---A little lower, he owns, or his reviſer for him, that *they* are *hurtful* and *dangerous* in *plethoric* habits, in caſes, where they may, to others, be proper and ſerviceable. *Here, they* cauſe, as he acknowledges, *fevers* and *convulſions*, and he ſhould have added, *fatal ſpittings* and *vomitings* of blood, in which, he is ſo abſurd as to preſcribe them. Thus goes on the *great* Coryphaeus of hydrochemiſts and phyſicians!

But, to crown his matchleſs abſurdities and contradictions, p. 254, he recommends, in particular caſes, the *warming* the *chalybeate waters*. The folly of which is moſt obvious, as it totally decompoſes the water, as it is ſufficiently expoſed in the ESSAY on waters.

Here, he comes to conſider the *differences of chalybeate waters*, which he aſcribes chiefly, if not ſolely, to the different proportions of the ſame impregnating *principles*, by which, I ſuppoſe, he means the *ingredients*, not the *elements*.

He concludes with *the method of uſing theſe waters*, which he confeſſes neceſſary to be drank at the ſpring-head; becauſe, as he ſays, they all differ in the carriage, even the *Pouhon* water is weaker here than at it's ſource, being partly decompoſed. See the ESSAY on waters; then judge how fit this man is to write upon waters, which he thus owns he never ſaw in perfection.

After a courſe of the waters, like ſome of his predeceſſors, without aſſigning any reaſon, he falls into the abſurd practice of ſtrong purges. A practice expoſed in the ESSAY on waters: and, in weak ſtomachs, he again, p. 255, directs the *warming* the water, or the adding ſome *volatil ſpirit* to it, in concert with *Muſgrave*. That is, to make it not much better than common water, by diſſipating it's mineral ſpirit, and ſo ſeparating the martial earth, by heat, or elſe *ſaturating* the mineral *ſpirit*, by a volatil *alcali*, that the *metallic matter* may be otherwiſe *precipitated*. An idle, ridiculous, obſolete practice, exploded in the ESSAY on waters; where all that he contains, related to the rational and true, and much more than he has delivered, in his great ſynopſis, are fairly ſet down, to the reproach of all who read them, and dare not give truth it's weight.

On p. 257, begins the third part of the introduction, *Of copper or it's vitriol, as an ingredient in mineral water.* From this to p. 259, he borrows ſome ſketches of the natural hiſtory of copper; here and there beſtowing it *ſulphur*, and an *acid* proper to itſelf; which he afterwards tells us, is the *ſpirit* of verdigriſe. This is a confuſion, too obvious to require any commentary, but ridicule.

After this, follows a train of experiments with *alcalies*, with *ſope*, with *lime*, and his other *precipitators*, *alum*, *ſilver* and *lead*; then, with ſimple *acids*, with ſyrup of *violets*, *blew paper*, *logwood*, *braſil*, *luteola*, or dyers-weed, *galls*, *ſumack*, *green tea*; all without any material, uſeful concluſion. Afterwards, he tries the effects of the ſame vitriol on animal juices, to as little good purpoſes or effects. And then, gives ſome sketches of the virtues of copper and it's vitriol, from other authors.

On p. 265, he again, as it were, begins BOOK IV. PART I. *Of the waters moſt properly called Acidulae*, and *firſt of the vitriolic waters.*

He ſets out with attempting to explode the titule of *Acidulae*, long given to the waters of *Spa*, *Pyrmont*, &c. joining with the deſervedly celebrated Dr. HALES, that theſe, from experiments, appear better to merit the appellation of *Alcalulae*. The great HOFFMAN, before theſe gentlemen, broached the ſame error. But, the argument is ſtated in the fair light, and the propriety of the term *Acidulae*, clearly eſtabliſhed, in the ESSAY on waters, Introduct. § 18, and in the hiſtory and analyſis of the waters of *Spa* and *Stavelot*, moſt expreſſively called, SUBACID *chalybeate* waters. Sect. IV. p. 112, and the following; where a *ſubtil acid* is proved to predominate,

dominate, by a number of experiments, which Dr. *Rutty* may not be able to conceive, as he is forced to confeſs, he never ſaw the water in the natural ſtate, or indeed, in any degree of perfection. Is this a matter to be overlooked by a lover of truth and reaſon? And does not the *Doctor* appear very ſolicitous to acquit himſelf of all imputation of both?

In the next paragraph, he points out the waters, he judges intituled to this appellation. And in the laſt, in concert with his worthy *predeceſſor* and *coadjutor* Dr. *Short*, he aſſerts the exiſtence both of *volatil* and *fixed vitriols* in divers waters, blaming Dr. *Liſter* for denying the *later*, but not daring to contradict the ESSAY on waters; in which, the *former* is exploded, with the force of truth, and ſome contempt and ridicule. A perſon who promiſes an *abſtract* of all the writers on this ſubject, could not with any regard to truth, or the public, overlook this. But, how little theſe are the objects of the *Doctor*'s attention, appear throughout this work univerſally.

He begins, p. 266, a recital of *his acidulae*, common *vitriolic* waters, ſuch as the waſhings of the *pyrites* in copperoſe-works univerſally afford; and theſe are continued to p. 310. All the waters that are ſenſibly acid and contain vitriol, or alum, or combinations of them, are reduced to this claſs. They are examined upon the *ſame principles* with the foregoing; therefore I ſhall paſs them over, as they afford nothing curious or new, more than the *Doctor* in treating them.

After theſe, are ſubjoined tables to repreſent the *concerto* experiments; and theſe are irregular and incomplete as the reſt, full of *blanks*, to be filled up by ſome ſucceding genius.

Theſe are followed by ſome trite obſervations on the tables, and ſome imperfect sketches of the virtues of the waters, from better hands.

After theſe, he forms an other head, cites BOOK IV. PART. II. *Of the common chalybeate waters.* Would not an accurate writer ſay where they are *common!* For, except a few places in Germany, ſuch water as our author calls *common*, are the moſt rare, curious and valuable.

The firſt of his *common waters*, is that of *Pyrmont*, which is not any where elſe yet equalled; therefore, unleſs to form the titule of a new ſynoptical head, of no more conſequence than titules of *nitrous*, *ſaline*, &c. to the preceding *genera*, it can not, with *vulgar*, avoidable propriety, he deemed or called *common*, no more than the reſt of the waters, with this thus claſſed.

Where he ſticks to the accounts of this water given by *Hoffman*, ſome truth may be learned, though not the whole truth; for *Hoffman* himſelf was not perfectly acquainted with the compoſition of this water, as far as we may judge from his works. The *Doctor* takes other *coadjutors*, *Rieger*, and *Turner*.

But wherever the *Doctor* gets out of leading ſtrings, there, like a neglected babe, the foundling totters, till he falls.

Nothing leſs would ſerve him to expoſe himſelf, than the examining this and ſome of the like waters, by his little ivory *hydrometre*, from which little or no certainty is to be drawn in common waters void of air. His incapacity of making ſenſible obſervations, moſt evidently appears from this: he placed his hydrometre, 1. in deſtilled water; 2. in Spa water; 3. in Pyrmont water, all of the ſame temperature. In the firſt, the machine ſtood at $5\frac{3}{4}$; in the ſecond, at $4\frac{2}{5}$; in the third, at $2\frac{1}{2}$ to 3. And this, the *Doctor* wiſely attributes to the different degrees of impregnation with ſolid contents. His error lies here: the waters that contain and diſcharge moſt air, let their ſolid contents be in what proportion they will, buoy up this machine the higheſt. Upon the firſt expoſure of any of theſe mineral waters to the air, a conſiderable quantity of their contained air, reſumes it's elaſticity, runs together, forms bubbles, flies off, and eſcapes. Whatever is oppoſed to it, in it's paſſage, collects and arreſts it, for a while: thus, the ſides of the containing veſſel, and every thing ſet aflote in the water, are found preſently covered with minute bubbles, which growing more and more large, become at length ſo buoyant as to get to the ſurface, where they burſt and unite with the atmoſphere. When then, the *Doctor*'s little inſignificant inſtrument is thrown into this water, air bubbles are preſently formed on it; which, as they increaſe in volume, buoy it up more and more; till growing too big at length, they burſt, fly off, and let the hyrdometre ſink, till more bubbles are formed upon it, and raiſe it as before; ſo that there is a continual ſucceſſion of this air, though ſtill upon the diminution, till at laſt it ceaſes; when alone the hydrometre can determine any thing with certainty. Hence, the *Doctor* is as little to be relied on in this, as in moſt of his experiments and obſervations. Yet all this is fully explained in a late author *, which the *Doctor* for reaſons beſt known to himſelf, does not chooſe to mention; though he promiſes *abſtracts* of all works of this kind. From this, the beſt method of determining their gravity is ſhewn to be by the balance. Part II. p. 851.

The *Doctor* and his coadjutors are all miſtaken, if they do not obſerve, the firſt viſible thing that ſeparates, in evaporating this water, after the pellicule on the ſurface, to be ſelenite, of which no notice is here taken. This he at length finds out in the reſiduum.

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* Eſſay on waters.

In enumerating it's operations and virtues, he expoſes his practice in as diſadvantageous a light as ever: For, p. 317, he ſays, *it tempers the heat of the blood*, and *agrees beſt with ſanguine and choleric conſtitutions*. The reverſe of which, all to a few exceptions for the laſt, is univerſally allowed by the beſt practitioners to be the truth.

He repetes the error, before expoſed, of *warming* theſe waters, which he judges requiſite for phlegmatics. The method he propoſes, ſeems *curious* and *new*: he recommends a well corked bottle of it to be ſet in a kettle of warm water, till it becomes milk-warm.—If the rarified air does not pierce the cork, ſure it muſt burſt the bottle. What if it does? If it then be onely mixed with the water in the kettle, it will be nearly as good as when heated by itſelf. The ſpoiling it, perhaps made it fit for the *Doctor*'s patients: for the leſs ſpirituous and chalybeate it is, the better, where he preſcribes it, in *hot blood* and *ſanguine conſtitutions*.

After the *Pyrmont*, he next takes the waters of *Spa*, or as he chooſes to call it, *Spaw*, under conſideration, reducing the experiments and obſervations of *ab Heers*, *Neſſel*, and *Chrouet*, to his own *immethodical* order. It is neceſſary to obſerve here, that *ab Heers* was long dead, before the ſpring now called the *Geronſter*, was diſcovered; that, which he knew, being ſince loſſed by accident. This is ſhewn in the ESSAY on waters, P. II. p. 199, 130; and ſhould prove a caution againſt taking the ſentiments of a dead, as well as of a living man, upon any ſubject, he had not ſeen or known.

In the examen of theſe waters, the *Doctor*'s uſe of ſope is moſt evidently abſurd. Theſe loſe all their mineral acid by agitation; whence, they lather upon the common agitation. Whereas, if the ſope were added, diſſolved in brandy, it's decompoſition with the acid of the water would appear moſt manifeſt. In the ESSAY on waters, this ſolution of ſope is uſed. The reſult of the experiment, ſhews the difference: when dropped into the new drawn water, milky, grumous clouds were formed at every drop: whereas it mixes ſmoothly and uniformly with the water agitated in a bottle, till it ceaſes exploding upon opening; that is, when, by agitation, it is ſpoiled of it's mineral ſpirit. See the ESSAY, P. II. p. 161, 194, &c.

This makes out one of this water's clames to the titule of *Acidula.* This is further made out by the turning of ſyrup of violets, firſt red, then changing gradually from that to *blew*, thence to *green*, as the *acid* ſpirit eſcapes, p. 152: this is further confirmed alſo by the *blew paper*, by the infuſion of *galls* not turning purple for ſometime, i. e. till the redundant acid exhales; p. 153, 154. This clame is alſo ſtrengthened by this water being capable, while in the natural ſtate, of diſſolving iron, p. 155, to 157. and confirmed by deſtillation, p. 165.

Here alſo, the effects of alcaline ſpirits, and ley; of all acids; of ſeveral metallic ſolutions, together with theſe, are all not onely demonſtrated, but fully explaned: but, none of theſe ſerved the purpoſes, or intentions, of Dr. *Rutty*; therefore, he had rather break his promiſe, than *abſtract* this work, and appear manifeſtly defective and erroneous, than borrow from a living author.

And what is the conſequence? After the *Doctor* is puzzled himſelf, and puzzles others, with a teadious detail of experiments; he knows ſo little of the conſtituent part of either water, that he concludes with *Rieger*, that *an artificial ſpaw* may be made *like the natural, by mixing ſalt of tartar and ſpirit of vitriol with the common chalybeate waters.* And this, while he is forced to confeſs the exiſtence in them of a *volatil acid*, different from that of *vitriol*, which he falſely conceives ſaturated by an alcali! though the *acid* planely predominates in the waters, in the natural ſtate. And beſides iron, he gives them a bitter, neutral ſalt, ſome calcarious earth, and a *ſpirituous*, or as he elſe where calls it, a *ſpiritualiſed*, ſulphur. Was there ever ſuch a maſs of inconſiſtency and contradiction? Had his modeſty allowed him to read, and fairly to repreſent it, he might have found all the component parts of theſe inimitable waters fairly demonſtrated in their ſeveral proportions, in the ESSAY on waters, part II. p. 170, 171, &c. and particularly from p. 247, to 153, where they ſtand recapitulated thus; ' The ſeveral ingredients are demonſtrated to be, 1. a moſt *exalted*, *ſubtil*, *volatil fluid*; with 2. a conſiderable portion of moſt *fine*, *elaſtic air*; 3. a *martial earth*, or *iron*, ſpoiled by ſolution or otherwiſe of it's *phlogiſton* and *metalliſing principle*; 4. *earth*, partly *abſorbent* or *calcarious*, partly *ſelenite*; 5. an *alcaline ſalt*; and ſome, as thoſe of Malmendy, of a ſmall portion, or as that of Tunbridge chiefly conſiſts, of *muriatic ſalt*; 6. of ſome portion of the *oily matter*, inherent to all water; and 7. the great *baſis* of all moiſt fluids, the *aqueous element*; without any appearance of *vitriolic tartar*; which muſt have attended the *Doctor's artificial* compoſition. Now, all moſt intimately blended, as they are wonderfully produced, by the inimitable chemiſtry of PARENT NATURE; this is either true or falſe: the public is intereſted in determining which. A lover of truth, a reſpecter of the art he profeſſes, and of the public, engaged in *collections* from works of this kind, ſhould either confirm or overthrow theſe arguments; which Dr. *Rutty* has not thought fit to do. Let the world judge his motives.

In different places of this part of *our author*'s work, he is pleaſed to diſtinguiſh the *names*, not the *eſſences*, of *mineral* and *metallic* ſulphurs. In p. 326, he declares the *Geronſter*, as well as ſeveral of our chalybeate waters, impregnated with this ſulphur, as well as with iron; but attempts no proof of the former, and declares both, *highly volatil.* What he means here, is beſt known to himſelf.

He aſſerts, p. 327, and elſewhere, that *Geronſter* water does not bear carriage. The ESSAY on water demonſtrates the contrary.

But, nothing can beat an idea of the volatil mineral ſpirit of the chalybeate waters into *our author*'s head: for, p. 328, he recommends, in concert with a very ingenious and learned gentleman, Dr. HALES, who is a better divine and philoſopher, than a practical phyſician, the dropping a few drops of the ſulphureous acid into the weaker chalybeates, ſuch as Tunbridge water, in order to make them keep and carry in bottles. Good *Doctor*, will *this* bear any, and what analogy, to the *volatil, mineral ſpirit* of the *Pyrmont* and *Spa* waters? or will it not anſwer as well, to diſſolve a little martial vitriol, a little copperoſe, in common water?

At length, he begins, p. 328, a detail of their virtues, borrowed, or rather *ſtolen*, from the miſerable empirics that have generally treated of them; for, he names but few of them, to p. 334, and ſeems to know none of the reputable writers.

After this, he treats the waters of *Schwalbach*, *Freyenwalde*, *Cleves*, *Roitſchen*, in the ſame manner, upon the like *principles*, with *like ſucceſs*, like *regard to truth*, to *juſtice* and his *promiſe*.

And, p. 338, he begins his hiſtory and examen *of the Britiſh and Iriſh chalybeates.* Theſe take him up, as far as the 393d p. All which, as far as I can diſcover by dipping onely into it, are treated like the reſt. And from this to p. 400, he gives us his remarks upon the preceding hiſtories and tables; in his *own method*, as uſual.

In theſe, there are but few things worth animadverſion. He judges, p. 394, that the *ebullition* of

theſe

theſe waters is owing, for the moſt part, to *calcarious* or *abſorbent earth.* The ESSAY on Waters, P. II. p. 160, &c. ſhews that this *ebullition* is inconſiderable in the waters of *Spa*, ſpoiled of their *volatil parts.* I hope the *Doctor* will not inſiſt upon a *volatil*, *ſpirituous* or *ſpiritualiſed calcarious* or *abſorbent earth*, as he does on *iron*, *vitriol* and *ſulphur*, with theſe properties. Nor can this failure of ebullition ariſe from the *loſs* of the *alcali*: for, *this*, with the *abſorbent earth*, are found in the reſidue of the waters after ſpoiling them, even by boiling and evaporation; ſo that the *Doctor*, however big with the *ſpirit*, he may be, cannot *ſpiritualiſe* this matter. It might not have been amiſs, or unworthy of this *elaborate compiler*, to ſet this argument in the fair light, which he might have done by examining and ſtating, or refuting, what is offered on this head, in the ESSAY, P. II. p. 160, &c. The moſt of the reſt of his obſervations are irreconcileable contradictions to the preceding parts of this weighty work.

Having paſſed through this part of this methodical medley, the next to be taken under conſideration is Book V. *Of alcaline waters.* In the *introduction* to this, part I. he treats of ALCALI, as an ingredient in mineral waters, with more propriety, than any ſubject he has yet touched on. But, the reaſon ſeems to be, there is but little of it, that can properly be called his own; till he comes to aſſert, p. 408, what he glances at in his preface, that the *native fixed alcali* is but a ſort of *ſalt ammoniac*, yielding, like *that*, a *volatil alcaline ſpirit* with *fixed vegetable alcalies.* This the *Doctor* aſſerts; let who will believe it. All the native *alcalies*, that have fallen under mine obſervation, have the ſame effect on ſalt ammoniac, that the artificial have. Both cannot be true. Beſides he confeſſes, that the *native*, as well as the *artificial*, *alcalies* ſerve to make ſope, glaſs, &c. This ſal ammoniac can not. It is to be wiſhed, he had explained what he means by nitrum murale alcalinum, where he firſt introduces it.

Moreover, he is forced to confeſs, that *native*, as well as *artificial*, fixed alcalies ſerve to make *ſulphur ſoluble* in water. Is this done by *ſalt ammoniac?*

But here, p. 410, the *Doctor* puts this quaere; *Is it not by the mediation of the native alcali, that the ſulphur alſo in mineral waters is rendered intimately miſcible with water?*---He anſwers himſelf, in the affirmative; declaring his finding the *mineral alcali* moſt frequently to occur in the waters, he calls *ſulphureous*. In the introduction to PART II. of the ESSAY on Waters, and in PART III. under the head of *Aken* and *Bath* waters, this important argument is fairly diſcuſſed. And it is there proved, that no water, ſulphureous in the ſenſe of *Rutty*, or of *Wallerius*, has ever yet been diſcovered in nature. In juſtice, as well as prudence, the *learned Doctor* ſhould have ſet this aſide, or have acknowledged it's force, before he went further.

It is not to be denied, that alcalies are frequently found in the waters, called ſulphureous: this is well proved at *Aken*. But, that there is no ſolution of ſulphur, wrought by means of alcalies, may be diſcovered from theſe conſiderations: artificial ſolutions of ſulphur in water by the means of fixed alcalies, are not remarkably, quickly fetid, before an acid is added. Then, and not till then, they become intollerably offenſive to the ſenſe of ſmell. And upon the addition of ſuch acid, let the impregnation with ſulphur be ever ſo ſlight, ſome degree of milkineſs, and a precipitation of ſulphur muſt enſue.

Now, though alcalies be found in all, or moſt, of the waters, deemed ſulphureous, they ſuffer no degree of precipitation by any acid; but, on the contrary, all acids render them clearer and preſerve their pellucidity. Beſides, I have not yet ſeen one of them, in which an acid did not predominate, ſo that the alcaline ſalt was not diſcoverable, till the predominant acid, with the fetid ſmell, were expelled or diſſipated. This fetid matter, in the ESSAY on Waters, is proved to be the *inflammable principle*; *which*, combined with the *vitriolic acid*, conſtitutes *ſulphur*. But, this combination can not be effected, while water interpoſes. It is therefore, in the volatil vapors, theſe principles unite and form ſulphur, which did not exiſt in the water in which theſe principles were diffuſed; becauſe there, they could not be united. See how this ſquares with the *Doctor*'s crude notions.

After this, he procedes to ſet forth the virtues of the fixed alcaline ſalts, as layed down by other authors, p. 413. And here, he makes an obſervation, that ſhould convince him of the prevalence of an acid in a water univerſally deemed ſulphureous; that of *Aken*: this, he finds, inſtead of cauſing or increaſing thirſt, as moſt ſaline, eſpecially the alcaline, waters do; ſlakes thirſt; which is ſurely owing to the acid predominant in them, in the natural ſtate.——After this, he gives a catalogue of alcaline waters, agreeable to his own indigeſted conceptions.

In the ſecond part of his *introduction*, p. 418, the *Doctor* has collected ſome fragments of the hiſtory of the *nitre* of the *antients*; which he obſerves, in concert with all the anthors, to be the *native alcali*.

After this, he borrows the account of another diverſity of this alcaline ſalt, and p. 422, tells us what he means by *nitrum murale alcalinum*. Then, he gives the characters of *nitre*, and of *ſal Perſicus*, p. 424; to which, we ſhall at preſent take none exceptions, for the ſake of brevity.

However juſtly he may point out the nature and properties of alcalies, by modern obſervations now made very plane; his notions of alcaline waters, and the claſs in which he places them, not with *ſaline*, where nature placed them, but with *metals*, where he has never found them, in nature, without being ſuperſaturated with a volatile acid; theſe argue him as ignorant, as he is immethodical.

The firſt inſtance of an alcaline water, he offers, is that of *Tilbury*; the analyſis of which, as well as it's virtues, he borrows, to make out his *one and twenty years labor*. In this, the exiſtence of a volatile acid is ſo evident, from, 1. it's growing turbid with the alcalies; 2. not mixing ſmoothly with ſope; and 3. from it's giving a conſiderable quantity of earth in evaporation; that it moves him even to doubt, upon which he puts the queſtion, p. 427, after the experiment with ſope, *Is not the water's curdling with ſope owing to a volatil acid, loſſed in decoction?* &c. But, though he ſees this in the Spa and other waters, he is not able to aſcertain it; but, as if it were, boaſts of his having *elſewhere ſhewn the co-exiſtence of acid and alcali in the ſame water*. Of this, neither he nor any man can give a ſingle inſtance: for, no proof of the exiſtence of an *alcali* can be given in any of the known waters, while an *acid* can be demonſtrated in them. Wherever the *acid* appears predominant, the *alcali*, found upon other trials, muſt be *ſuperſaturated*; for, without this, it is not to be conceived how an earth or a metal can be held ſuſpended in a water, in which both an *acid* and an *alcali* are found. It is this acid, that makes the ſirup of *violets* and *blew paper*, firſt *red*, in *Spa* waters, and for a while, *prevents* their ſtriking *purple*, with galls. It is this, that prevents the ſirup of *violets* growing inſtantly *green*, in this water, as well as in that of *Aken* and others. While the *acid exiſts* or predominates in it, the *earths* and *metals* remane *ſuſpended*; but, this diſſipated, by air, agitation or fire, the *alcali* becomes *predominant*. What is the conſequence? The ſame with *ſaturating* the *acid* with an *artificial alcali*; a *precipitation* of the *metal* or *earth*, which before was diſſolved by the means of the acid. Now, though nothing is more ſtrongly inculcated than this doctrine, throughout the ESSAY on Waters, it has had none effect on *our learned author*, who chooſes to appear *new*, even in ignorance and abſurdity, than to embrace and declare the truth.

The next inſtance, he gives, is the water of *Clifton*, then *Lochneſs* in *Scotland*; without a ſingle experimental proof; then *Tober-bony*, upon experiments; *Carrickmore*, St. *Bartholomew's*, *Cape-clear*, and ſeveral others, which contain different earths, as well as alcalies, which could not be, were there not an acid in the natural ſtate predominant; ſince acids' keeping them clear, and alcalies' cauſing a precipitation, are collateral proofs, that the *alcali* is not here the *ſolvent* of theſe earths, more than of the iron, in the chalybeates. So that it is plane, the learned *Doctor* has not yet been able to ſhew a water purely alcaline, or in any degree of ſtrictneſs or propriety of ſpeech, *alcaline*, in the natural ſtate; in which alone, the denomination ſhould properly be given to any water.

In the foregne waters, p. 440, he does not ſuccede much better; though the *Selter* water comes neareſt his notion, while he places it ſo remote from *his head*. But, even this contains an earth, with which it does not part, till it's acid is diſſipated or ſaturated. See the inſufficiency of his experiments, and his deficiency in reaſoning upon them!

In one or both of the following inſtances, the *Doctor* is moſt groſsly miſtaken: he ſays, *Selter* water, *ſaturated with the vitriolic acid*, *yields* vitriolate tartar. If this were true, it would *determine the ſalt of the water to be the* artificial, vegetable fixed *alcali*. This, I hope, he will hardly inſiſt on. Then, he tells us, *that if this water be charged with the* nitrous acid; I ſuppoſe he means not that of his nitre, which is Epſom or Glauber's ſalt, ſee his nitrous waters; *the reſult on evaporation will be*, what he calls, *nitrum cubicum*, quadrangular nitre. Now, if *this* be *true*, which is moſt probable, the *former* muſt be *falſe*: for, the *mineral alcali*, giving *quadrangular nitre* with the *nitrous*, or *ſaltpetre acid*, muſt give the purging bitter ſalt, Dr. *Rutty*'s *nitre*, with the *acid of vitriol.* But, if with the vitriolic acid, the ſalt of this water forms a vitriolate tartar; with the acid of nitre or ſaltpetre, it muſt give pure nitre or ſaltpetre; which determines the *alcaline* ſalt to be *vegetable*, not *mineral*; as is amply explaned in the ESSAY on Waters; a teſt, which the *Doctor* did not chooſe to hold forth to his work of *one and twenty years.*

The *Doctor*'s accuracy and perſpicuity do not more clearly appear in his reaſon for the *Selter* water and ſpirit of nitre yielding his cubical nitre; which he laconically, let me ſay, parenthetically, pronounces to be (*an argument of marine ſalt.*) Why not the *baſis* of marine ſalt, the *mineral alcali?* Give a reaſon, *good Doctor.* But, let me not be unreaſonable, and demand an impoſſibility.

After theſe, he comes, p. 443, to conſider of *waters impregnated with natron and ſulphur.* He begins with that of *Wiggleſworth*, in the deſcription of which, he ſays, *it is very black*; an idea which I cannot conceive of water, though ſome be ſo called, in Ireland, as well as in England; for, I ſhould as ſoon call ink, as this, a water. We can onely learn from his borrowed experiments, that it is a putrid, watry maſs, charged with muriatic and alcaline ſalt, and much phlogiſton; no complete ſulphur, that our author ſhews. Thus he, in his firſt inſtance, for want of principles, fails.

His examen of, and the imperfect inferences drawn from his experiments on, the ſucceding waters

ters of this claſs, are all of a piece, and determine no more than the preceding; till he comes to Drumgoon water, which, he ſays, *gives a white cloud with acids*, p. 451. This is the firſt indication of a natural ſolution of ſulphur, that this or any other author has as yet given, and deſerves purſuing to aſcertain the truth; this is what has been ſought and demanded, in the ESSAY on Waters, of the aſſerters of ſulphureous waters. Surely if this were ſo, the *Doctor* could not be ſo inattentive, as not to purſue it. He would have continued the experiment, obſerved the increaſe of the fetid ſmell; have procured ſome of the white precipitate, and proved it a magiſtery of ſulphur; if ſuch it were: this would have left no room for diſpute. But, it was like the reſt, an experiment at random, and not to be depended on, even by the author, without repetition. If it were true, could it be ſuppoſed, that the moſt ignorant in experiments could overlook the firſt, the moſt ſtriking phaenomenon of the kind? Or, that he would not ſet it down in his *tables?*

After a detail of ſome more waters of this claſs, he comes, p. 454, to form a new claſs of waters, never diſcovered by any one but Dr. *Rutty*; theſe are what he calls, *waters impregnated with natron and iron*, onely.

If this means any thing, it muſt expreſs waters impregnated with *iron*, by the means of *natron*; for otherwiſe, in the *collector*'s ſenſe, theſe might ſtand among the chalybeate waters, in which, *iron*, and *natron* are found. *Stahl* has taught us indeed, how *iron* may be diſſolved by a *fixed alcali:* this has not yet been found in nature. But, our *Doctor*, ignorant of the matter, puts this out of all doubt; for he ſhews an acid predominant, as well in the ſmell, as effects of this water. He even calls it *an acid, vitriolic and ſulphureous ſpirit*. And, though after this is ſaturated or diſſipated, an ochrous earth and a native alcali be found in it, we ſee no reaſon for ſeparating it from the other chalybeate waters, but the ſtrong deſire of multiplying heads, and reducing, or rather forcing, waters into genuſes, unknown in nature, and abhorred by all the lovers of imitative art.

The other waters of this claſs are alike miſplaced and miſtaken, as well as a genus *intirely new*, and firſt of all men, ranked among minerals, by the *inimitable Dr. Rutty*.

This *Doctor* has ſomewhere found, that there are *volatil*, as well as *fixed*, *alcaline*, and alſo *ammoniacal*, ſalts found in the *earth*; and that the ſmells and taſtes of thoſe are called *urinous*. And, ſince the *animal* kingdom had thus far made war upon, and actually invaded, the *mineral*; the *juſt Doctor*, well verſed in *jure belli et pacis*, judged he had a right to make *repriſals*, and force a well known part of the territories of the *invader*, to ſubmit to the laws of the *invaded*.

This, I hope, will be thought a ſufficient apology for the *Doctor*'s bringing into the hiſtory of waters of the *mineral* kingdom, that of a very *curious fountane* in the *animal* territories; to which, the greateſt heroes and philoſophers of antiquity, of both ſexes, as well as Dr. *Rutty*, have not diſdained to pay greater reſpect and veneration, than are in our days payed to the ſanctified wells of any canoniſed ſaint in the calendar, whether male or female.

It is a pity *our Doctor* was not a little more converſant with this ſpring: then, he would certainly have deſcribed it, with all it's environs. But in this, he is generally defective, and takes too much upon truſt; contenting himſelf with a ſight of the water, ſent him from any diſtance from it's ſpring. This is the caſe at preſent. However, he might in his uſual perſpicuity and preciſion, at leſt have given us the name of the ſpring, of whoſe waters he treats; but in this alſo, he is ſometimes too apt to ters of this claſs, are all of a piece, and determine no more than the preceding; till he comes to Drumgoon water, which, he ſays, *gives a white cloud with acids*, p. 451. This is the firſt indication of a natural ſolution of ſulphur, that this or any other author has as yet given, and deſerves purſuing to aſcertain the truth; this is what has been ſought and demanded, in the ESSAY on Waters, of the aſſerters of ſulphureous waters. Surely if this were ſo, the *Doctor* could not be ſo inattentive, as not to purſue it. He would have continued the experiment, obſerved the increaſe of the fetid ſmell; have procured ſome of the white precipitate, and proved it a magiſtery of ſulphur; if ſuch it were: this would have left no room for diſpute. But, it was like the reſt, an experiment at random, and not to be depended on, even by the author, without repetition. If it were true, could it be ſuppoſed, that the moſt ignorant in experiments could overlook the firſt, the moſt ſtriking phaenomenon of the kind? Or, that he would not ſet it down in his *tables?*

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be ſuperficial, giving the water alone a name. Let me here endeavor to help out the *Doctor*'s deficiency a little.

The well, whoſe curious mineral waters he takes into conſideration, p. 456, is not to be confined to any nation or climate; it is as common as men or beaſts, univerſally; for the proper, the ſole uſe of each of which, the Creator has been pleaſed to furniſh out one, with each of theſe animal ſpecies.

That, whoſe waters the *Doctor* ſeems to have principally examined, in Ireland, is called †, by the natives; by the Engliſh and Engliſh-Iriſh, the fluid is called, *piſs*, or *urine*; by old women and maids, *water*, or *all-flower water*; by chambermaids, *chamberley*; by grooms, *ſtale*; but by ſuch as chooſe to make out *ſynoptical claſſes* of *mineral waters*, introducing this as one, it is called, AQUA FLORUM OMNIUM, and with reſpect to the author, *Ruttienſis*; *Rutty's methodical ſynopſis* of MINERAL WATERS, Book VI. Sect. iv. p. 456.

It is pity, he did not aſſign the genus, and make out a proper head for this water. At firſt ſight, I expected he would have ranked it with the chalybeate waters, from the remarkable hiſtory of the Yorkſhire cow, that fed upon knives and forks. It is not placed far from that claſs. But, as it is likely ſuch a cow might have *volatiliſed*, or, in the *Doctor*'s own phraſe, *ſpiritualiſed* the iron or ſteel, or the iron and ſteel, before it came off in her *mineraliſed* water; the *Doctor* thought it beſt to claſs it with waters, impregnated with *natron* and *iron*; perhaps with not much leſs propriety than in any of the reſt. I am ſure he muſt have had ſome doubt about placing it among the *bituminous* waters. And, as it will admit of ſome conteſt, to aſcertain the claſs, to which it may moſt properly belong; I wonder the *Doctor* did not ſet it at the head of a new genus, and call it *Aqua ſpirituoſa, volatilis, accido-alcalino-ſalino-ſulphureo-bituminoſo-phoſphorea:* becauſe, by chemical reſolution, it affords productions, which anſwer his conceptions and deſcriptions of the denominating ſubſtances, and their chaotic combinations. One part of it, he muſt confeſs, *burns*, *ſmokes* and *ſtinks*, like *his* ſulphur; ſo that it ſhould not be far removed from *his ſulphureous*, or *ſalino-ſulphureous* waters. But, I am tired of trifling with this trifler, who hardly deſerves ſerious notice: with him, ſerious argument loſes both it's force and dignity.

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† The appellative not to be expreſſed here, for want of Iriſh types. So this blank, like thoſe in the tables, muſt be filled by the pens of men converſant with the ſubject and the language.

After this, come ſix tables of experiments, in *concerto*, *blanks*, as uſual. Being affected with the recital of a milky precipitation in *Drumgoon* water *, I looked for it here; but I find it was *ſpiritualiſed* before the table was made out; for it is not once glanced at; nothing being ſet down, but a *minute ebullition*, a word never to be ſeen in his manuſcript before April 1756; this effect being till then called, as now it generally remanes in the text, *fermentation*.

Having thus got clear of Book V. which is marked, the VI. from p. 426, to p. 460, we are come to an other diviſion of the *methodical ſynopſis* of *minerali-animal waters*, called, for the multiplication of heads, Book VI. and VII. Though on all the ſucceding pages, VI. is every where ſuppreſſed and VII. onely marked, as the number of the book. But, this was very neceſſary, and appears to be one of the *Doctor*'s *new diſcoveries*; ſince, without this ſupernumeration, the work muſt appear ſhorter, by a book.

This ſixth or ſeventh, or *ſexto-ſeptimian* book begins, p. 462, with an introduction, *of earth as an ingredient in mineral waters*. Here, he enumerates the various earthy matters, with which waters may be impregnated. Theſe, he allows, to be generally ſuch terrene bodies as are found ſoluble in ſome natural or artificial ſolvent. But, he has diſcovered, in concert with an other great man, that cryſtal, which is ſoluble in no menſtruum, known in nature or art, and which is vitrifiable, not calcinable or otherwiſe deſtructible by fire, is found *ſometimes diſſolved* in water; p. 463. Shall I diſpute this point with the *Doctor* or *any* of his *coadjutors?* God forbid! It is but modeſt to cede to *great authority*, when one is reduced to the proof of a negative.

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* See p. 64.

In the next paragraph, he tells us of *ochre, diſſolved* in waters. I will give him credit for this, when he ſhews me iron, ſeparated in any other form, than that of ochre, from any liquor, in which it is diſſolved, by nature or by art. This, had truth been his object, he might have found explaned in the ESSAY on Waters.

Then, he procedes to give ſome account, in his uſual manner, of *limeſtone*, *chalk*, *ſpar*, *marl*, &c. as ingredients in *mineral waters*, to p. 472; when, he as ſuperficially, cautiouſly touches upon the *ſelenite*, *gypſe*, and *talc*, as an ill-fed aſs bites at a thiſtle. These, he does not poſitively ſet down as component parts of mineral waters, but as ſuch as may *poſſibly be ingredients in* waters. If he looks into the ESSAY on Waters, he, or an underſtanding man, may ſee how the *ſelenite* is *generated*, how it is *known*, how it *impregnates*, and how it is *diſcovered* in waters; and muſt be convinced, that it is not onely in *Pyrmont* and *Spa*, but in *Bath* and *Briſtol* waters, and in ſhort, in all thoſe, he calls *calcarious*. But, why ſhould the *Doctor* be forced from his favourite *novelty*, to the ſtreight bounds and rules of truth and ſenſe, which he every where ſo induſtriouſly diſclames?

After this, he attempts to give *the characteriſtics of calcarious matter in water*; p. 473, and then, *the operation and virtues of the calcarious waters*, p. 474, not without his uſual ſucceſs.

Then, he takes *petrifying ſprings in general* under conſideration, gathering the little he knows of them, from other authors, moſt imperfectly and incorrectly. After which, he procedes in the ſame manner to conſider particulars, beginning with the dropping well at *Knareſborough*, by the analyſis of which, he onely ſhews, it conſiſts of *calcarious earth* and the *natural*, *bitter*, *purging ſalt*, and, as he ſays, without any proof, *ſulphur*. He never ſhews the nature of the acid, by which the earth is diſſolved, and onely examines the earth in the lump, never ſeeing how far it is ſoluble or inſoluble in acids, to determine the quantity of ſelenite, it contains. He pronounces it ſulphureous, without the common proofs of his ſulphur; for, it cauſes a white precipitation with ſolution of lead. Is it poſſible the *Doctor* could be ignorant of the true methods of analyſing this or any other water, of telling it's ſeveral ingredients, and their proportions, with due preciſion, after having read the ESSAY on Waters? And, if he could not correct or improve upon this; to what intent ſhould he trouble the world with unmeaning experiments upon waters, of whoſe ſources, he is ſtill more ignorant than of that of *his Aqua florum omnium?*

Thus he goes on with the analyſes, equally imperfect and inconcluſive, of ſeveral other waters of this nature, which extend to p. 484;

Where, he forms an other ſection, *Of milkey waters*. Theſe are none other than *turbid* waters, conſiſting of *chalk*, *marl*, *fullers-earth*, or *tobacco-pipe clay*, and can therefore no more be properly conſidered as a *ſpecies* of water, than *mud*, or the *black* water, *our author* before mentions; ſee p. 63. The *author* himſelf in effect proves this; for, in his analyſis, he ſays, that on ſtanding, all this white matter ſubſides: which ſhews it never was more than mixed, not fairly united, with the water. But, it ſerves the *Doctor*'s purpoſe, and the bookſeller's: it makes a *new claſs*, in the *new method*; inlarges the *one* and *twenty years*' labor, and ſwells the volume of the invaluable book, *the univerſal hiſtory*, the *great ſtandard* and *teſt* of mineral waters.

The thread of the diſcourſe on this curious water is ſomewhat broken by the introduction of a table, calculated for 104 *concerto experiments*, of which there are but 55, ſomewhat more than one half *blanks*; but this is nearer the mark, than the *Doctor* generally hits, in tables or text. Thus ſhines *his light!*

Now, as the tranſition, from mineral to animal juices, was eaſy and familiar to the *Doctor*, in introducing his *Aqua florum omnium*, with his *natro-chalybeate* waters; ſo he finds the tranſition from *ſtone* to *oil*, ſo eaſy and familiar, that without ſo much as forming a new diviſion, a chapter, or a ſection, he falls from *ſtones*, to the conſideration *of bitumen*, mineral oil, *as an ingredient in waters*, p. 485; I ſuppoſe no man will diſpute the *novelty*, more than *the author* can excuſe the abſurdity, of this method, moſt immethodical. It is but a new proof of the *Doctor*'s chooſing to be moſt regularly irregular, to appear *intirely new*.

At ſetting out, he takes care to inform us what he means by *bitumen*; and that he would not have us, for this, miſtake the inflammable bodies, found floting on, or as he calls it, *in the ſcums of chalybeate and ſulphureous waters, and in either the ſcums or ſediments of the ſalino-nitrous, vitriolic, and calcarious waters.* In none of theſe ſcums, has the *Doctor* ever been able to ſhew any *truly inflammable* body; the ſcum of the ſecond, third, and fiveth eſpecially, are the *reverſe* of combuſtible, *calcarious earth.* Whereas, in the reſidue after evaporation of all, but *his* ſulphureous, which are not to be deemed other than *putrified* waters; the lighteſt and pureſt not excepted; an *oily matter* is to be found, in different proportions, as explaned in the Essay on Waters, againſt which he ſhuts his eyes and ears.

But, *this* is not known to the *Doctor*; conſequently, it is not to be looked upon as *his bitumen*, though it is the *bitumen* of one of Dr. *Rutty's coadjutors* in Bath water; ſee his much admired Dr. *Charleton's* celebrated Treatise.

To obviate all miſtakes, *our Doctor* collects the hiſtory and analyſis, together with the medicinal virtues, of various bitumens, from different authors. This takes him up, from p. 486, to p. 493, incluſive. Yet after all, he has conceived but a moſt crude, if any, notion of their nature and production.

Modern diſcoveries have now made it appear, that, not onely all bitumens, from *naptha* to *ambar*, but all foſſil coals, are vegetable productions, mineraliſed. Thus, in ambar mines, the foſſil wood, yielding the liquid bitumen, is found; and under this, the vitriol mine, in paſſing through which, it imbibes the acid, that indurates it. And thus, in many coal mines, we find proof, that all foſſil coal is either a thick, groſs, bitumen, mixed with earth and the vitriolic acid, or actual wood, converted into coal; of which I have a fair ſpecimen, yet in part wood and partly coal, from the province of Naſſau in Germany. Thus alſo, peat, or turf, is but an amaſs of roots and plants of moſſes and other vegetables, dying yearly, and by degrees mineraliſed into a combuſtible matter, different from the vegetable, whence it was derived. From theſe like ſubſtances, we derive their oils, more eſpecially in hot climates, and theſe are more or leſs ſubtil and light, as they happen to deſtil pure by ſome ſubterranean heat; or, pitchy and groſs, as the more ſubtil and light parts are exhaled, or as they meet with more or leſs mineral acids in the bowels of the earth.

The chemical reſolution of moſt bitumens ſhews their analogy to the vegetable, eſſential oils and reſins: for, they both yield oils of different degrees of tenuity and pellucidity, and an acid; leaving a black, coaly matter behind. They differ in this; theſe vegetable oils and reſins mix with one another, and diſſolve in rectified ſpirit of wine; bitumens, of the liquid kind eſpecially, mix with the vegetable oils, but in general are but ſlightly affected by ſpirit of wine.

Whoever conceives how a water may be impregnated with a vegetable oil, and how the impregnation may be diſcovered, can beſt judge how and when waters become bituminous; which, *our Doctor*, has not yet been able to demonſtrate, or conceive.

The mineral acid is more intimately united with the bitumens, than the vegetable acid with the reſins, the liquid eſpecially. The waters, with which the turpentines and balſams are agitated, moſtly get ſomething of the oil, by means of the acid. Thus, that empyreumatic, liquid reſin, *tar*, yields a water ſtrongly impregnated with the vegetable acid and ſome of the oil of that reſin. But, the bitumens are much leſs apt to impart any thing to the waters, on which they are found; unleſs when theſe are charged with ſome ſalt, that may promote the ſolution.

Hence, Dr. *Rutty*'s accounts *of the bitumen waters of Great Britain*, p. 493, to 496, are in fact hiſtories of *bitumens*, in which, nothing ſingular of the water is related. The ſame may be ſayed of his pretended hiſtories *of the foreign bituminous waters*, from p. 496. to p. 501. in which, he relates nothing reſpecting the waters, *as bituminous*; but confines himſelf to imperfect ſketches of the hiſtories and virtues of the *bitumens alone*. How foregne is all this to it's place here? and in every ſenſe to the titule and purport of a *methodical ſynopſis of mineral waters?* If the *Doctor* had had any notion of method or order, or had ſubmittted the publication of his book to any man of competent judgement of ſuch a work; when he made an head for bituminous waters, he would have placed under it, his account of Logh Liaſh, i. e. the *Medicinal Lake*, with that of the other *bog waters* of Ireland in general, which he touches on, p. 15. and whoſe virtues principally depend upon the imperfect bitumen in bogs. But of this, we find the *ingenious*, *the ſagacious*, and *laborious Dr. Rutty* has not the leſt notion, when he ranks theſe, the *onely bituminous* waters he ever ſaw, with the ſimple or ſweet, and colorleſs waters of ſprings and rivers. Which ſhall we admire moſt in this *wonderful author*, the *naturaliſt*, the *chemiſt*, the *philoſopher*, or the *phyſician?* Hence, judge of thoſe who gave the manuſcript a character.

So much for the well-put-together *ſixth and ſeventh* books of *ſtoney* and *oily*, or *bituminous*, rather *non-bituminous waters*; and now for Book VIII. *Of the cold ſulphureous waters*; firſt taking in, the introduction, *Of ſulphur, as an ingredient in waters.*

It might be hoped, the unpleaſing, and ſeemingly ill natured, taſk of finding fault, would be over, or at leaſt diminiſhed, by this time. But, a man that ſets out upon *bad*, or rather *no principles*, can hardly be expected to mend, in any proceſs, unleſs by accident.

It is not to be wondered, that *Baccius*, who pretended to no knowledge in chemiſtry, and truſted chiefly to his ſenſes, or like our author, to thoſe of others, in judging of the compoſitions of waters, ſhould give falſe denominations and falſe ingredients to waters. His errors ſhould ſurely caution, not lead, a curious inveſtigator of nature and nature's laws, by the lights of the chemic art. What pretenſions our *ſynoptical* writer on this ſubject has to this light, ſhall be ſeen in the ſequel.

He boaſts of the modern diſcoveries of ſulphur in waters, cold as well as hot, by his worthy *coadjutor*, Dr. *Short*, in England, and by himſelf, in Ireland, p. 503.

In the next paragraph, he tells us, he took care to annex this book of ſulphureous waters to the preceding, by reaſon of the affinity between ſulphur and bitumen. Suppoſing this to be juſt, why did he ſeparate them? Why were they not in one book, under one head; inſtead of coupling *oils* with *ſtones*, in the preceding book with two numbers?

To prepare for the abſurdities, over which, he then ſat brooding, and which he ſince brought forth; he takes care to give the definition of ſulphur, in the *lax ſenſe*, *ſo as to comprehend any oily*, *fat or inflammable ſubſtance in the mineral*, *vegetable*, *or animal kingdoms*. So that he may not be contradicted, when he calls bitumens, oils or reſins of vegetables, or the fat or greaſe or fleſh of animals, or tartar or ſugar, or the yelks of eggs, or any thing elſe that is combuſtible, *ſulphur*.

Sometimes ſulphur with him, though unknowingly, implies, the *phlogiſton*, or the inflammable principle of BECHER and STAHL, explaned in the ESSAY on Waters, though beyond *our author*'s conception: for, he ſpeaks, p. 504, of the *native mineral ſulphur of metals*, being the ſame with that of vegetables and animals, and ſays *there is ſcarce any metal free from ſulphur*; and then tells us, that *the effects of putrifying bodies*, in ſewers and jakes particularly, are *the ſame* with thoſe of *ſulphureous waters*. Compare this with the idea of *ſulphur*, and *ſulphureous* waters, eſtabliſhed in the ESSAY on Waters, and ſee the inextricable confuſion, into which *our author* falls, and would lead his readers; and that, after the ſtrait path was fairly chalked out to every intelligent eye.

His five following obſervations are alike abſurd and falſe; particularly the fiveth, which tells us, that *putrifaction manifeſts the ſulphur in divers waters:* for, it will appear, that without *putrifaction* his *ſulphur* in waters is not to be found, and that putrifaction produces his ſulphur, not onely in waters, but in all bodies that contain any thing inflammable, and are capable of putrifaction. Thus far then, his *ſulphur* is but *phlogiſton*, which abounds in many bodies, bearing no relation to ſulphur, except in inflammability.

But, unfortunately for the ſupport of the *Doctor*'s confuſed notions, he attempts to *lay down the characters of ſulphur*, *in order to eſtabliſh the criteria*, *by which it's preſence* in *any water is to be determined.* How does he ſucceed? As uſual.

Here, he *loſes* his *phlogiſton*, I may ſay *himſelf*, and is forced unluckily to *ſtumble* upon *ſolid brimſtone*, p. 505; which ſoon after, trips up our *Doctor*'s heels, and leaves him groping in the dark, and ſprawling in the mire.

His definition is ſhamefully defective and confuſed, compared to that of any rational writer, that went before him, particularly the laſt, whom he ſtudiouſly affects to avoid; ſee the ESSAY on Waters, P. III. p. 33. and judge of the *Doctor*'s love or averſion to truth; and learn his curious, *new* diſcovery, that a concrete, which he juſt mentions as *hard* and *friable*, is not *malleable*. Diſpute the *novelty* and ſenſe of this with Dr. *Rutty*, who will: I ſhall not.

After giving ſome of the common properties of his *ſtumbling-block*, he attempts to tell it's compoſition; and, becauſe all the preceding writers of character, particularly the laſt, ſhew it to conſiſt of the *ſimpleſt native acid*, and the *inflammable principle*; the *Doctor of new diſcoveries* puts in a *liquid bitumen*, and calls *ſublimation* and *mixture* by *ſubterranean heat* to his and nature's aid; though the mineral be confeſſedly found mixed with *pyrites*, with the ores of moſt metals and metallics, as well as in many earths, from which ſublimation muſt undoubtedly have freed it.

In the immediately following and other ſucceding paragraphs, he in effect contradicts the preceding; ſhewing ſome of the various kinds and combinations of ſulphur, which he does not even find ſublimed about *Veſuvius*, or indeed any where elſe, but, as he imagines, in *Aix la Chapelle*; where, the production of ſulphur is demonſtrated to bear no relation to ſublimation. See the ESSAY on Waters, P. III. on *Aken*. But this is truth, whoſe ſtern countenance our author dare not behold.

Having thus fixed *our author* to ſolid ſulphur, let us ſee how he makes it capable of impregnating water, when he tells us, p. 506, *that this reſina terrae, quite different from every kind of ſalt, is neither miſcible with water, nor ſoluble by acids.*

But, for this, he finds a *ſalvo*, which will undo his hypotheſis: he ſays, the *ſolution* of *ſulphur*, in waters, is effected by *an alcaline ſalt, which he ſhews to be a very frequent concomittant of the cold ſulphureous waters, as it is of the baths of Aix la Chapelle*, p. 506, 507.

Let us try to hold *our Doctor* to this, and ſee what analogy *his ſulphureous* waters bear to the *artificial ſolution* of *his* or *Boerhaave's ſulphur ſolubile*, conſiſting of nine parts of flowers of brimſtone and two parts of a fixed alcali united; and to that, made by the means of lime, which, he as juſtly obſerves, makes ſulphur ſoluble in water, as *alcalies* do. All which is ſet forth in the fulleſt force, and cleareſt light, by demonſtrative experiments, in a book which the *Doctor* dare not cite; the ESSAY on Waters.

Now, p. 508, and the following, he makes experiments on the ſolutions of the *hepar ſulphuris*, or *ſulphur ſolubile*. Theſe, in the preceding page, he truly obſerves, were of a yellow, greeniſh color, which he never obſerved in any of *his* moſt ſulphureous waters. *They were alſo very fetid*; but not ſo fetid as any of his ſulphureous waters; unleſs when an acid was added to them. And, though he found *ſulphur in ſubſtance thus diſſolved in water*; the *ſolutions* had a ſharp *alcaline taſte*, which was never diſcovered in any of the waters, he calls ſulphureous, in the natural ſtate. But yet, all theſe, and much more to the ſame effect, in the ESSAY on Waters, could not convince the *Doctor* of his error: he ſtumbles on, till he falls.

Yea more; p. 508, he ſays, *that as alcalies are the proper ſolvents of ſulphur*, he will forgive the mending his expreſſions here, as well as elſewhere; *ſo are acids it's proper precipitants.* Allowed. Now, let the *Doctor*'s ſulphureous waters be proved by this teſt, and he muſt confeſs, there is not one of them that gives full, convincing proof of an alcali predominant, or of containing a ſolution of ſulphur.

1. That none of *his ſulphureous* waters are *alcaline* in the natural ſtate, appears from theſe conſiderations; 1. that they ſhew no taſte or other effect of an alcali, before the volatil mineral acid is diſſipated, with which the faetor vaniſhes; nor any color; which is the reverſe of the ſolution of ſulphur; 2. if the *waters* were purely *alcaline*, they could contain *none earth*, ſo as to ſuffer *any change* upon the addition of *other alcalies*; as is the caſe with the *ſolution of ſulphur*; whereas, *all* the *Doctor's ſulphureous* waters, contain a predominant *acid*, which *alcalies ſaturate*; and thence make the *earth*, by this acid ſuſpended, *precipitate*. 3. This is not the onely proof of *his ſulphureous* waters' being charged with an *acid* and void of all ſolution of ſulphur; for, *acids*, which render all *alcaline ſolutions* of ſulphur *milky* and *turbid*, and *precipitate* their *ſulphur*; *mix* with *our Doctor's ſulphureous* waters; and ſo far from cauſing a *precipitation*, or rendering them in any degree *milky* or *turbid*, they *unite* with the predomi-

nant *acid*, and *improve* and *preſerve* the *pellucidity* of the water; except in one or two moſt doubtful inſtances, hereafter to be mentioned; p. 80. But, this is but waſting time with *Dr. Rutty*. He ſaw all theſe truths illuſtrated, in the ESSAY on Waters; but he had not the courage to embrace, or give them their due weight.

The next trials with his ſolutions of ſulphur are with metals and their ſolutions. Gold is highthened in it's color, ſilver is changed to that of gold, copper, blewed iron, or blackneſs, and it's ſolution, precipitated of different ſhades of brown, according to the weakneſs or ſtrength of the impregnation with ſulphur.

Now, theſe effects are fully demonſtrated in the ESSAY on Waters, and ſuch experiments carried much further, and clearly explaned. It is there ſhewn, that theſe effects are wrought, not onely by the *alcaline ſolutions* of *ſulphur*, but by the *hard boiled* or *roſted yelks* of *eggs*, as well as by all *bodies in a ſtate of putrifaction*. Hence, it is concluded, that the effects are not to be aſcribed to the mixt, called ſulphur, but to the *phlogiſton*, or the inflammable principle, one of the ingredients of ſulphur, abounding in *all combuſtible* bodies; ſince *all theſe*, in a *putrid ſtate*, in which this volatil, ſubtil eſſence is ſet at liberty, as it's connection with it's native acid in ſulphur is broken by the interpoſition of an alcali; produce effects analogous to ſulphur in this ſtate of ſolution. *Our author* ſurely, in reſpect to truth and the public, ſhould have received this, or have ſet it aſide, and ſaved the unneceſſary trouble and expence of a perplexed, voluminous publication.

He carries on theſe like teadious obſervations, to p. 511, without offering any thing uſeful or new. It is however remarkable, that he here implicitly embraces a remark of *Caeſalpinus*, that *ſilver yields it's ruſt to the vapors of acids, which*, meaning the ruſt I hope, *is of a blew color, and prefered to ultramarine* *by the painters.* Whether the unfortunately cited author ſays this or not, I have not time at preſent to enquire. I know *Rutty* ſays it; for, thoſe are his words. Let them come whence they will, the principal part of the allegation is falſe: pure ſilver yields no color, to any pure acid capable of diſſolving it. When *allayed* with *copper*, indeed, it is otherwiſe; it gives a blew. And thus *Dr. Rutty* had it, never knowing the difference between *pure* or refined and *allayed* ſilver, till moſt of his experiments were made. Where he then learned it, I will not tax his gratitude, nor ſhock his modeſty, with repeating.

After this, *our author*, with his *uſual perſpicuity* and *regard* to truth, procedes to the explanation of the characteriſtics of ſulphureous waters. And here, he evades even his own principles, in many inſtances; particularly, in the firſt paragraph, p. 511, where he ſays, *thoſe ſulphureous waters are perfectly pellucid, in which the ſulphur is intimately diſſolved*; though his own experiments, in the preceding ſolutions of ſulphur, prove the contrary.

But, he truſts more to the *ſmell* and *taſte*, as *a far more diſtinguiſhing* and *ſure teſt of ſulphur in waters.* Agreed. Let him rub ſulphur on his hand and ſmell it. He will find a ſmell proper, peculiar to ſulphur. The ſame is to be ſayed with reſpect to it's taſte. In what then, does the ſmell and taſte of *our author*'s ſulphureous waters agree with pure ſulphur? We are every where told, that theſe ſmell and taſte of *boiled*, *roſted* or *rotten eggs*, or the *waſhings* of a *foul gun.* Let any one judge of the truth of the analogy.

His ſecond poſition on this page is far from ſerving his purpoſe. It is true, as he happens to aſſert, that *artificial alcalies do not, as in moſt other waters, cauſe any coagulation or white cloud, but keep clear with thoſe ſulphureous waters, wherein the natron or native alcali*, is the predominant ſalt. But, there is no holding the *Doctor* to this juſt rule:

he immediately ſays, *that this is frequently the caſe* in waters. This, I deny; having never yet ſeen, or been informed upon credible teſtimony, of any ſuch water. I am ſure, it is not true in *Aken* water. And unfortunately, in the three inſtances, the *Doctor* gives, *Wiggleſworth*, *Quin-Camel* and *Drumgoon*, nothing of this appears, but juſt the reverſe in the ſecond inſtance. And ſoon after, he gives a ſtill clearer contradiction of himſelf; where he confeſſes, *that this mark of ſulphur in waters does not hold univerſally*, on account of *the calcarious nitre*, *or earth*, *with which many of them are charged*, *which always exhibit a whitiſh opacity with alcalies*; which, being interpreted, ſignifies, that the *earth* is *precipitated*, whenever the *acid*, *ſuſpending it* in the waters, is *ſaturated* by an *alcali*. Confer p. 77. See how he underſtands and obſerves his own rule!

If this does not convince *our Doctor* of his deceiving himſelf and the public in becoming an author of a work of this kind, let him ſee how he ſupports his third poſition, where he juſtly gives a precipitation with acids, as a ſure teſt of a ſolution of ſulphur in waters; as juſtly, aſcribing the precipitation occaſioned by alcalies, to an abſorbent earth, which muſt have been diſſolved by means of an acid. On this, let the truth of the doctrine, with reſpect to ſulphureous waters, in the ESSAY on Waters, be tried, adjudged, ſtand or fall.

How was I ſtaggered, when the *learned Doctor* gave inſtances of three ſeveral waters, namely, *Moffat*, *Swadlingbar*, and *Kilaſher*, in which, *ſuch a milkineſs is actually produced by the mixture of acids?* Who could be ſo obſtinate as to deny this being a *fair precipitation*, a *magiſtery* of *ſulphur?* But, who will believe, what I with grief and ſhame relate, that each of the three inſtances, by the *Doctor*'s own accounts, are FALSE?

But truth muſt be told, let who will rue it: in p. 517, the *Doctor* expreſsly ſays, that *Moffat* water *turns whitiſh with oil of tartar*. And, in the next line, ſuch is the memory of a man, who greatly ſtands in need of a better; he as expreſsly aſſerts, that the ſame water *exhibits a milky color with oil and ſpirit of vitriol, and with ſpirit of nitre, but no precipitation:* one or other of theſe muſt be falſe. If we may judge of one of the moſt ſulphureous waters known in the world, that of *Aken*, the former is true, the later falſe.

As to the ſecond inſtance, *Swadlingbar*, this he confeſſes, p. 522, *firſt curdled a little*, but after agitation, *lathered* ſmooth with ſope; and *exhibited but a very minute cloud and precipitation with the fixed and volatil alcalies*. Let the reader chooſe whether he will believe this, or the reverſe on the oppoſite page, 523; where it is ſayed, paragraph the ſecond, that *all the acids cauſed an ebullition and a precipitation:* both can not be *true*. Therefore it is to be judged, which is *true*, and which *falſe*.

The ſame is alſo recorded of the third inſtance, *Kilaſher* water. And as both can not be *true*, we are here alſo to endeavor to diſtinguiſh the *true*, from the *falſe* poſition.

Paſſing over the trite remarks in the ſubſequent poſitions, we come to his laſt, p. 512, where he aſſerts, *that beſides ſome few of theſe waters, which yield ſulphur in ſubſtance*, as thoſe *of Aken and Buda, the reſiduum of theſe waters in general, whether obtained by ſpontaneous precipitation or by evaporation, is either inflammable, or at leſt, ſparkles and ſtinks on the red hot iron, and ſometimes burns with a blew flame, though it muſt be confeſſed, but very rarely*.

Why is not this rare inſtance given? And why does not the *Doctor* ſhew a water, beſides *his ſulphureous*, whoſe reſidue upon evaporation does not ſmoke, burn, flame and ſtink upon a red hot iron? I own, I know of none that does not.

he immediately ſays, *that this is frequently the caſe* in waters. This, I deny; having never yet ſeen, or been informed upon credible teſtimony, of any ſuch water. I am ſure, it is not true in *Aken* water. And unfortunately, in the three inſtances, the *Doctor* gives, *Wiggleſworth*, *Quin-Camel* and *Drumgoon*, nothing of this appears, but juſt the reverſe in the ſecond inſtance. And ſoon after, he gives a ſtill clearer contradiction of himſelf; where he confeſſes, *that this mark of ſulphur in waters does not hold univerſally*, on account of *the calcarious nitre, or earth, with which many of them are charged, which always exhibit a whitiſh opacity with alcalies*; which, being interpreted, ſignifies, that the *earth* is *precipitated*, whenever the *acid*, *ſuſpending it* in the waters, is *ſaturated* by an *alcali*. Confer p. 77. See how he underſtands and obſerves his own rule!

If this does not convince *our Doctor* of his deceiving himſelf and the public in becoming an author of a work of this kind, let him ſee how he ſupports his third poſition, where he juſtly gives a precipitation with acids, as a ſure teſt of a ſolution of ſulphur in waters; as juſtly, aſcribing the precipitation occaſioned by alcalies, to an abſorbent earth, which muſt have been diſſolved by means of an acid. On this, let the truth of the doctrine, with reſpect to ſulphureous waters, in the ESSAY on Waters, be tried, adjudged, ſtand or fall.

How was I ſtaggered, when the *learned Doctor* gave inſtances of three ſeveral waters, namely, *Moffat*, *Swadlingbar*, and *Kilaſher*, in which, *ſuch a milkineſs is actually produced by the mixture of acids?* Who could be ſo obſtinate as to deny this being a *fair precipitation*, a *magiſtery* of *ſulphur?* But, who will believe, what I with grief and ſhame relate, that each of the three inſtances, by the *Doctor*'s own accounts, are FALSE?

But truth muſt be told, let who will rue it: in p. 517, the *Doctor* expreſsly ſays, that *Moffat* water *turns whitiſh with oil of tartar*. And, in the next line, ſuch is the memory of a man, who greatly ſtands in need of a better; he as expreſsly aſſerts, that the ſame water *exhibits a milky color with oil and ſpirit of vitriol, and with ſpirit of nitre, but no precipitation:* one or other of theſe muſt be falſe. If we may judge of one of the moſt ſulphureous waters known in the world, that of *Aken*, the former is true, the later falſe.

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For brevity omitting many other enormous errors of the like kind, in every thing he does not borrow or ſteal, in the ſubſequent pages, I now come to his account *of the cold ſulphureous waters*, beginning at p. 515.

His firſt, is a chapter of apologies for not introducing *Aix la Chapelle* hot baths and other waters, in his ſenſe, highly ſulphureous, under this head.

He begins his ſecond chapter with what he calls *ſulphureo-ſaline*, *viz. Moffatt water* p. 516; of which, he proves no more, than that it is a *putrid water*, whoſe phlogiſton ſtrikes the noſe with a *ſtench*, *tarniſhes ſilver*, and *blackens* the ſolutions of *ſilver* and of *lead*, and whoſe ſolid contents are *muriatic ſalt*, and *calcaricus earth*. In a note at the bottom, he tells of ſomebody, that found the marcaſites, through which this water paſſes, contain a little *cold copper*, a diſtinction, with which I have not the honor of being acquainted. The reſt of this and the following page is taken up with the virtues and uſes of the water, which rather belong to *ſalt*, than *ſulphureous* waters.

Chapter III. gives a new claſs, Nº I. *Sulphureo-nitrous waters*, of which *Nottington* water forms Section I. Here is a ſtrict, *new method*. This is ſayed to have all the ſenſible qualities of the other, the ſmell more inclined to that of boiled, and ſome, of rotten, eggs; the color tending to blew. It tarniſhes ſilver and blackens the precipitate of the ſolution of this metal, as well as of lead. It curdles with ſope, becomes milky with alcalies, and cauſes a minute ebullition with the vitriolic acid: and upon evaporation, it yielded an abſorbent earth, with ſome native fixed ſalt, and probably ſea ſalt; the *ſuppoſed ſulphur* all flying off. Where is the nitre?

Section II. gives an hearſay account of the water of *Fouſanche*, from the author of the natural hiſtory of *Languedoc.* We are told, p. 521, that an artificial water, like it, is made by boiling common ſulphur in lime-water; which, as *our author* ſays, ſuccedes alike in imitation of that of *Swadlingbar.* This muſt then be a yellow water or ſolution; but as to this, we are left in the dark, both in text and tables.

But, the later imitation, the *Doctor* thinks fit to contradict, in more than one inſtance, in Sect. III. where we learn, that though the water of *Swadlingbar* varies in color from *limpid* and *tranſparent.* to *blewiſhneſs*, *milkineſs* and *wheyiſhneſs*, it is not mentioned ever to tend to yellow, the color ſulphur muſt give lime-water. It's *ſmell* is like the others, and like them alſo *loſſed*; *changes ſilver* and it's ſolution. By evaporation, it *yields* a *calcarious earth*, and the native, fixed alcali. After this, he runs into ſome aukward, unmeaning comparative experiments of Ruſſia potaſhes and ſolutions of ſulphur by fixed alcalies and by quicklime in water; from which, nothing concluſive is, or may, be drawn. And then, gives a teadious detail of the virtues of the water, with caſes to atteſt them. In all which, I have learned nothing curious, but a *new method of roſting* water, in the note on p. 535; after which, the detail is continued to p. 545, every where, confounding *his nitre*, with that of the *antients*; to which, it bears no more relation, than *Epſom ſalt*, to a *fixed alcali.* Compare p. 84, 418, 519.

After this, he procedes to give accounts of other like waters, of different countries, as far as p. 576, with none other teſt of ſulphur, or of *his nitre.* Chapter IV. takes in a *new* head, *ſulphureo-chalybeate waters.* The firſt example of this mixture in waters ſeems a little unfortunate. To prove it a chalybeate, we are told, p. 577, *that it ſtrikes purple with galls.* And, *that it's ſulphureous quality quadrates, in ſome meaſure to it's turning white and green with ſolution of ſil-*

ver,

ver, and pearl-colored, with that of lead. Underſtand this, who can. Thus he procedes with waters of the ſame kind, as far as p. 585. He ſeems to find no ſort of difficulty in forming this claſs. Nor does he attempt to give an idea how the impregnation is effected. There are but two ways in which I can conceive this poſſible to be done. The one is by adding iron to hepar ſulphuris, in fuſion: the metal will diſſolve in this, and partly mix in ſolution with the maſs in water, But, the liquor muſt be colored, and the metal will ſoon ſeparate and precipitate. This can hardly be the *Doctor*'s impregnation. The other method is by the putrifaction of any chalybeate, or conveying a ſubtil ſolution of iron to any putrid, water. Thus, and thus onely, can I conceive this laſt claſs formed. See how it differs from *Pyrmont*, *Spa*, or any other ſtrong chalybeate *putrified*. But, what anſwers the deſcription moſt exactly is, the vegetable ſcum of *Bath* water, put with ſome of the water into a wide mouthed bottle, as I have found it, when ſent to London in hot weather. In a few days, it putrifies, throws out the cork with an exploſion, ſtinks egregiouſly, ſparkles in the glaſs, tarniſhes ſilver, and ſtrikes a pale purple with galls. Who will call this a *ſulphureous* water, though it be planely *putrid* and *chalybeate?*

This is followed by an appendix of the ſame kind of waters, that the *Doctor* has not had time and opportunity to claſs. And this book is concluded with tables of *concerto* experiments, partly, as uſual, made up of *blanks*; yet all commented upon in the uſual ſtrain, with ſtiff form and great ſolemnity.

We now come to take a view *of our celebrated author*'s Book IX. *Of baths, or of hot and warm waters*, p. 589. His *introduction exhibits a ſummary view of baths throughout the world.* He gives it as his opinion, againſt all the beſt modern writers, that all baths derive their heat *from ſubterranean fires, or, at leſt, a ſubterranean heat extrinſec to themſelves.* The reſt is a medley collection, in which I can obſerve nothing new, but mention of ſome moſt extraordinary waters, that do more than I comprehend any water capable of, *burn or kill any animal that falls into them.*

This is beyond any thing that chemiſts have yet conceived: for, they unanimouſly aſſert, that no water can be heated to ſuch a pitch, as to make it burn any matter. Indeed, boiling water ſets fire to phoſphorus; but yet it extinguiſhes fire, in all other bodies, as well when hot, as cold. Sure the *Doctor* will not take it ill, that we can not believe the water he mentions will *burn* any animal, or other body; till he aſſerts it, upon his own knowledge. One part of his account may be believed; the water may *kill* any animal that falls into it: all our cold waters in England do the ſame; the animal, unleſs an aquatic or amphibious, is drowned, if he can not ſwim.

In the firſt part of this book, p. 593. *our Doctor* procedes to give an account *of the domeſtic hot and warm waters.* But, as I judged theſe were ſo exextremely numerous, ſo widely different in the ſeveral towns, or even houſes, of theſe kingdoms, for which I ſuppoſe he writes; that I did not think it poſſible, till he firſt learned, from what ſource every family was ſupplied with *domeſtick hot and warm baths.*

While I ruminated on this, to conſider how it may be done, well remembering that ſome of the native Iriſh make their *domeſtic hot and warm waters,* as well as ther *domeſtic poſſets,* with a red hot iron or ſtone; I thought the taſk moſt difficult, from the incertainty of the degrees of heat, as well as of the impregnation from iron or ſtone. But, upon caſting mine eyes lower down, I find the *Doctor* has altered his extenſive purpoſe, and begins with Sect. I. *Of the Baths of Bath in Somerſetſhire*; upon which, I congratulated him and conſoled myſelf; though I am ſure, he can not mean theſe under his firſt head; as they can be no where *domeſtic.*

He takes upon him to abſtract and methodiſe the works of all the conſiderable writers, *the principal authors who have treated of them*; yet purpoſely overlooks, without daring to ſquint at, one of the laſt, tho' perhaps not of the leſt authors, that wrote upon them; one who made more convincing experiments and obſervations, more diſcoveries, than any of thoſe that went before him; moſt of whom, he convicts of the groſſeſt errors to be layed to any writer's charge; *Dr. Rutty*'s always excepted.

In this diſſertation, *our author*'s perſpecuity is equal to his candor: he does not name a writer that pretended to analyſe theſe waters, that has not been convicted of ſome of the groſſeſt errors, in the ESSAY on waters; except MAGEW, of whom I have never heared before, more than of his Dr. PIELSCH, elſewhere cited. And it is there ſhewn, that the particular author, on whom the *Doctor* moſt relies, has given the world the moſt crude and erroneous performance, that had appeared, before Dr. *Rutty* commenced a *methodical analyſer* of *mineral waters.*

I muſt go further, and aſſert, that there is not a material truth, relative to theſe baths, in Dr. *Rutty*'s collection, confirmed by his own obſervations, that is not ſet in a fairer, ſtronger light, in the ESSAY on Waters; in which, many diſcoveries are made, beyond the reach of the *Doctor*, and his *junto* of anomalous authors. But, to purſue the *candid collector* a little cloſer;

I ſhall overlook the points, in which Dr. *Rutty*'s authors and the ESSAY on Waters agree, in every thing, but expreſſion. Dr. *Charleton*, one of our author's *late accurate enquirers*, whom I avoided naming, for reaſons given, in the ESSAY on Waters; in p. 31. of his celebrated treatiſe, ſays, that a *ſolution of ſilver*, in the *Bath* water, *formed dark clouds, which gradually becoming black, deſcended and formed a ſediment of the ſame color.* But, in p. 46. he finds it otherwiſe, or changes his mind; for here, he ſays, *the ſame ſolution turns the water milkey, and the metal ſubſides.* The ESSAY tells us, Part III. p. 305, that this ſolution *cauſes bright, blewiſh, white clouds*; which upon ſtanding, ſhew ſomewhat of a purple hue.

Our author, who had rather truſt to one of the *faithful*, prefers Dr. *Hillary*'s judgement, who calls the precipitation, *white*, with a *blewiſh caſt*. Meth. Syn. Min. Wat. p. 595.

But, in a corollary, after this, Dr. *Rutty* pronounces, that *the hotteſt of the baths probably contain ſulphur*, aſſigning no reaſon before or after. An error, experimentally confuted throughout the ESSAY on Waters.

After an experiment of *curdling milk* with the Bath water, *our ingenious Doctor* aſks, if this power of curdling milk be not chiefly owing to the volatil, vitriolic gas? The ESSAY ſhews experimentally, it is not; as the water, boiled for ſeveral hours, produces the ſame effect.

Our author ſays, by ſeveral trials, *the vitriolic principle appears to be extremely fugitive.* The ESSAY ſhews the fallacy and folly of the notion, and ridicules Dr. *Charleton*'s attempts to *intrap* and *catch* it. P. III. p. 294. to 297. and elſewhere.

He ſays, that *Charleton* obſerves *the* King*'s bath to tinge doubly ſtronger than the others, with an* equal *quantity of galls.* The ESSAY, by repeted, inconteſtible experiments, proves the chalybeate impregnation, equal in all.

Dr. *Rutty* ſays, p. 596, Sir *William Petty* diſcovered that the coloring ſilver yellow at Bath, was a fraud. Where this appears, is not known; nor did it, if it were, convince the inhabitants or practicioners at Bath; till the Essay publiſhed the long received deception, and, by numbers of inconteſtible experiments, ſhewed, there was no *ſort* of *ſulphur* in the Bath waters.

He ſays, p. 297. *the ochre in part evaporates, being found adhering to places expoſed to the ſteam of the bath.* This, I take to be one of the *Doctor's novelties*, his *own invention*, for which he can ſhew no foundation; unleſs he takes the corroſion of the iron rings and handles about the baths, for ſuch ochre.

He attempts to prove a *calcarious matter mixed with the ochrous.*—The Essay ſhews, beſides theſe, the *ſelenite.*

He cites *Charleton* to prove, *that a cataplaſm of the bath clay in drying on the skin, betrays ſomething ſulphureous in it's ſmell.* Does not *brick* and *potters clay* in every kiln do as much?

He gives the ſame authority to prove, *that the ſand of the bath contains ſomething ſulphureous and vitriolic.* The Essay gives every requiſite proof, that what he calls *ſand*, is part of the *mother-pyrite*, which heats and impregnates the baths.

Though the exiſtence of *bitumen*, as well as *ſulphur*, be denied in the waters; yet Dr. *Charleton*, approved by *Rutty*, extracts by evaporation an *oily matter* from the water, which he deems to be, if not ſulphur, the principle of ſulphur.—The Essay ſhews this to be the *oily matter*, common to all waters, before they are *putrified*, and the principal cauſe of the *fetid ſmell* and effects of phlogiſton, falſely called *ſulphur*, in the *putrified* waters. And *challenges* the *Doctor* to ſhew any water, that is not putrid, free from this *oily matter*, or one that is not, *in this ſenſe*, ſulphureous. Which neither he, nor his worthy ſucceſſor, has yet done.

As an other argument of *Bath* water's being *ſulphureous*, Dr. *Charleton* fuſed the reſiduum with ſalt of tartar, and obtained a red or gold-colored tincture from it, with alcohol. The Essay ſhews, what every good apothecary knows, that fuſed ſalt of tartar alone gives the ſame tincture; what is kept in the ſhops under the titule of the tincture of ſalt of tartar. The reſiduum of every common water does as much as that of Bath, in this reſpect.

Dr. *Rutty* aſſerts, p. 598. that the groſs reſiduum in calcination ſhews ſigns of ſulphur. The Essay proves, it has no more marks of ſulphur than the ſediment of any common water, in the ſame manner obtained.

Dr. *Charleton* and Dr. *Rutty* agree in leaving the word *ſulphur* vague and indeterminate, to ſerve their purpoſes, as an *aſylum ignorantiae*, or *ignorantium*. The Essay defines and confines it to it's proper ſenſe and meaning.

The learned Dr. *Oliver*, whoſe name is purpoſely avoided, till it is ſeen frequently cited by *Rutty*, founds the efficacy of the Bath waters on their *ſulphureous* and *ſaponaceous* qualities: while the Essay on Waters ſhews nothing more *foregne* to their nature than *ſulphur* and *ſope*.

In ſhort, the Essay was the firſt writing, in which it was fairly proved, in oppoſition to theſe and other gainſayers, that the Bath waters were in *no ſort impregnated* with *bitumen*, with any ſort of *ſulphur*, with any kind of *nitre*, or any ſort of *alcali*; and that fairly demonſtrated, by unqueſtionable experiments and obſervations, that every *pint* of the king's bath water, with it's *acids*, and *oily matter*, contained about ſeventeen granes of ſolid contents; of which about one thirtieth part of a grane, is *iron*; ſomewhat leſs than ſeven granes, *earth*; of which

leſs

leſs than half, is *abſorbent* or *calcarious earth*, above half, *ſelenite*; and about ten granes of a *mixed ſalt*; of which, near a third is the *native purging bitter ſalt*, the reſt, *ſea ſalt*; all blended in an *aqueous fluid*, *heated* about twenty degrees above the ordinary, healthful ſtate of the human blood. And the comparative analyſis of the baths of *Aken* is, with that of theſe, layed down. P. III. p. 325, &c.

Now, all this is either true or falſe. It was incumbent on a man, that intended to publiſh any thing on the ſame ſubject, to determine which it was; and to ſet theſe poſitions, with ſtronger arguments, aſide, to improve upon them, or be ſilent. But, inſtead of this, our *candid collector*, drawing corollaries from the groundleſs poſitions of other men, as well as his own; inſiſts, that the principal minerals, diſcovered in theſe waters, are *a calcarious and marly earth*, *an ochre*, *and marine ſalt*, *a little calcarious nitre*, *a gas vitrioli*, *a little bitumen*, *and ſome pittance of ſulphur*. And from this abſurd, ridiculous concluſion, does *our Doctor* procede to declare the *operation*, *virtues*, *uſes*, *and abuſes* of theſe waters, in the various ways of applying them! p. 498. Truſt him who will. However, to do him juſtice, this, like the reſt, is but an ill-judged *collection*; in which, I can diſcover nothing new, but a falſe aſſertion, p. 605. to wit, that the *baths of* Bath *are frequented in ſummer*. That they *are not*, is one of the loudeſt complaints, in the ESSAY on Waters, againſt the many enormous irregularities in the medical oeconomy in that city; where, not onely the prices of lodging and boarding are reduced, but the phyſicians leave and neglect the town, in ſummer.

But, I ſuppoſe, in this, the courteous *Doctor* meaned to pay a compliment to the author of the ESSAY, judging his arguments of ſuch weight, that his advice ſhould take place, in bringing the patients and phyſicians to the baths, when they are found moſt ſalutary, in ſummer.

After glancing at the American baths, ſome of which he learns to be *ſulphureous*, he comes next to *Buxton* baths, which have as little analogy to either, as any two waters in the whole work. But here, heat ſeems the onely rule for claſſing the waters *ſynoptically*.

This and *Briſtol* water, he attempts to analyſe, with his uſual confuſion. And thence, draws this incoherent concluſion, by way of corollary, p. 614. 615. that *it's contents are chiefly of the genuine calcarious, abſorbent kind, and probably a pittance of impalpable ſulphur. Impalpable* is as good a word as *ſpiritualiſed*. Both ſerve *our author*'s purpoſes; they are either unintelligible, or determine nothing.

Now, by the ſimpleſt, moſt concluſive experiments, the *Briſtol* water is ſhewn to contain, 1. The common baſe of the compoſition, ſimple water; by exhalations from decompoſing *pyrites*, at a certain diſtance, *impregnated* with ſome of the *groſſer*, but more of the *ſubtiliſed*, univerſal *acid*, and alſo by *thoſe*, *heated* to the degree ſet forth. 2. Water thus charged, meeting with an *alcaline* and *calcarious earth*, with ſome proportion of the *mercurial principle*, it is not difficult to conceive how the impregnation we find ſhould be effected. To wit, 1. The *groſſer*, with the *volatil acid*, uniting with an *alcaline earth* or the *mineral alcali*, give the *vitriolate ſalt*, diſcovered in theſe waters. 2. Theſe *acids*, with the *mercurial principle* and the *alcaline baſe*, conſtitute the *ſea ſalt*, obſerved in them. And 3. Theſe *acids*, meeting with, and diſſolving, *abſorbent earths*, muſt yield a *calcarious earth* and *ſelenite* upon evaporation. Agreeable to this theory, it is, that theſe waters appear by experiments to be thus impregnated. One might have expected, that a lover of nature, art, and truth, would have embraced, eſtabliſhed, or ſet aſide, this doctrine, before he could ſit down to write upon the ſubject. From his notions of the impregnation, the *Doctor*'s practice might be judged. But, in that, he prudently chooſes to be ſervilely empirical.

Upon the *ſame principles* and in like manner, he treats the waters of *Matlock* and *Mallow*, concluding at p. 625.

Now, let us follow him to *Aken* or *Aix la Chapelle*; where, by the by, we ſhall find, he never, in any ſenſe, arrived. Theſe waters furniſh him out a *new head*, Part II. and for fear he ſhould be ſuſpected to mean them *domeſtic*, though they are as much ſo to many people, as thoſe to which he gives that appellation can be, in any ſenſe; yea, much more ſo, as ſome people have them in their houſes; he diſtinguiſhes theſe by the appellation of *foregne baths*, giving them the firſt claſs, that are *impregnated with ſulphur*; though by his teſts, of ſolutions of ſulphur, they give not a ſingle proof of being, in his ſenſe, *ſulphureous*; while it is notorious, that no known waters afford ſo much of that mineral, and in ſo great perfection and purity, as the baths of *Aken*.

But, his errors in this will be leſs wondered at, than thoſe in any other of the waters, He was never at *Aken*. And he has not hit upon one of the very few, who have conceived a right notion of the waters. Not one of the writers, from whom he borrows, except HOFFMAN, was capable of making a concluſive, analytical experiment. And one of HOFFMAN's greateſt faults was ſuch a deſire to be a voluminous author, as prompted him ſometimes to write on ſubjects of which he was not maſter. His errors and thoſe of BERGER and others on this head, are explaned in the ESSAY on Waters *: for, allowing for difference of capacities, they were as liable to err, in this inſtance, as *Rutty*; ſince neither ever ſaw the baths, and both took what they offer, upon truſt; the curſe of multitudes of the writers of our age.

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* P. III. p. 57, 136, &c.

But, it is fortunate for the beſt writers on this, as well as other ſubjects, that they did not come in the *collector*'s way; becauſe, they would certainly, not be underſtood, or be miſtaken, perhaps mangled, *to reduce them to* his *uſual method*, as he is pleaſed to call it, to make out a *ſynopſis intirely new*.

Miſerably defective and erroneous as *our collector* appears elſe where; his ignorance and errors in this, excede thoſe in all the preceding waters.

The laſt, and I may ſay, the onely writing, that gives a rational and clear idea of the natural, civil, and medical hiſtory of theſe baths, their nature and properties, conſtituent parts and productions, and their general uſes and abuſes, is one the *Doctor*, more cunningly, than honeſtly, lays aſide. But, as the beſt apology to be offered for this; let it be remembered, that he might have found the work beyond his comprehenſion, or ſo full of a frightful inflammable ſubſtance, called *phlogiſton*, as to endanger the intire ſubverſion or deſtruction of his *intirely new method*. To ſhew fully the enormous errors and defects of this ſhameleſs, I had like to have ſayed, ſenſeleſs, *collector*, would require a volume, not leſs than a tranſcript of the diſſertation on theſe baths in the Essay on Waters, to which I chooſe to refer the curious reader.

He does not determine the heat or other ſenſible qualities of theſe waters: he does not ſo much as mention a thermometre here. And as to the taſte, he ſays, p. 626. *though the emperor's bath yields flowers of ſulphur in it's vault, it is very ſweet and fit to drink.* In the Essay on Waters, P. III. p. 57. it is ſayed, *ſome compare the taſte to that of rotten eggs;—to my palate, it appears ſaline, ſomewhat bitter and lixivial.* This is far from ſweet. And ſo far is this water from being in other reſpects *fit to drink*, that in the natural ſtate, it is too hot to be borne.

One of the *collector*'s agents informs him, that the ſmell of theſe waters reſembles that of his *cold ſulphureous* waters. The ESSAY on waters teaches a more determinate idea, in comparing their ſmell to that which riſes upon pouring the acid of vitriol upon filings of iron, to a ſolution of ſulphur in an alcaline ley, or rather to that which riſes upon pouring an acid into ſuch a ſolution; and ſo on to *vapors* of ſolutions in which *ſulphur* is actually *generated*; a diſtinction, which I muſt ſuppoſe beyond the conception of Dr. *Rutty*.

After this, come ſome of his *collected* experiments, which puzzle the *Doctor* exceſſively, ſeeming to overturn his whole ſyſtem of *ſulphureous and alcaline* waters. P. 626, he ſays, *this water grows milkey with the ſolution of ſalt of tartar.* True: it is not then purely *alcaline*. *It does*, ſays he, *the ſame with the ſolutions of ſilver and lead.* The ESSAY on Waters will ſhew his miſtake: for, both *theſe ſolutions* give highly *diſcolored precipitations* with the thermal water in the natural ſtate, p. 94, 95, &c. for reaſons there aſſigned, though ſomewhat beyond the *Doctor*'s reach, or he certainly would have produced them.

From theſe, and ſuch like other miſtakes, the *Doctor* ſeems to be ſo far ſtaggered, as to be inclined to *ſuſpect theſe waters leſs ſulphureous than his ordinary ſulphur waters*; till he found his *capital teſt* of *ſulphur*, which is as ſtrong in the *roſte yelk* of an *egg*; to wit, *it's tinging ſilver of a gold color*, &c. It is ſubmitted whether this is to be beſt expoſed by reaſon, or ridicule.

But, he finds, as he obſerves in the next paragraph, that it is a *diſputed point*, *whether it ſuffers any ebullition upon the mixture of acids.* If any thing could ſet ſo wrong an head to rights, and prevent the falſe concluſions drawn from a falſe poſition, it would be the ESSAY on Waters; where, a *contraſt* with *all*, even the *ſlighteſt acids*, and the cauſe of it, are fairly ſet down and explaned; and where it is ſhewn, to the confuſion of ſuch *crude ſulphur-mongers*, that the *acids*, inſtead of cauſing any degree of *precipitation* or *milkineſs*, which they muſt do in a *ſulphureous water*, upon *Rutty*'s plan; they render the water *clearer*, and *preſerve* it's *limpidity*; which, *without the acids* it muſt ſoon *loſe*: theſe are fully made out and explaned in the ESSAY on Waters, P. III. p. 86, 87. If this does not overturn the *collector's ſyſtem* of *ſulphureous waters*, nothing can: for, ſure no water known produces ſo much ſulphur, as that of *Aken*; yet it ſtands but one, and that the moſt indeterminate, of *our author*'s teſts.

In the concluſion of the ſame paragraph, he ſays, *that it's ſalt is not a pure alcali.* He muſt have ſeen, that it contains *two ſalts*, the one *muriatic*, the other the *baſe of muriatic ſalt*, the pure *mineral alcali*, by reading the above ESSAY, p. 107, 108, 109, &c.

Upon turning to the next page, the poor *Doctor* is not found much leſs unfortunate; he ſeems bewildered in his palpable errors; which may be called *wilful*, as he through obſtinacy, pride or ſome worſe motive, rejected the means of coming at the truth.

Though the waters of *Aken* anſwer but one, and that the moſt imperfect, of his *teſts* and *characters* of ſulphureous waters; though they *are not alcaline* by his confeſſion; as they ſuffer a precipitation by ſtanding, as well as with alcalies; and undergo an ebullition upon mixture with all acids; without any degree of, or tendency to precipitation, rather with the reverſe; yet, he, unluckily for his ſyſtem, finds, or hears and believes, that large quantities of the *moſt pure*, *true flowers of ſulphur are collected on the walls and vaults of the baths, where they are ſublimed by a ſubterranean heat.*

He is a bad evidence in any cauſe, that *tells the truth* and not *the whole truth*. What are we to think of an evidence, who delivers falſehood rather than truth? Yea who ſuppreſſes profered truth?

Now, the whole proceſs of producing and collecting ſulphur at *Aken* is faithfully and accurately layed down in the ESSAY on Waters. It is ſhewn to be collected in the *vaults of the ſources onely*, not in the *vaults* or on the *walls of the baths*, where the *Doctor alone* has found it. The manner of producing it is by experiments demonſtrated, while the impoſſibility of it's being a *ſublimation*, as the *Doctor ingeniouſly* contends, is put out of all diſpute: Becauſe, ſulphur requires to be melted, to render it capable of ſubliming, and it's fumes in ſubliming muſt be condenſed by any water, hot or cold. Then, the ſulphur at *Aken* is produced from the confined vapors of the waters, which can never be heated hot enough to ſublime or melt ſulphur. And they are ſhewn to be incapable of melting, or in any manner raiſing, their own ſulphur; which, when it happens to fall in, can never riſe, till it is, by human means, removed from the bottom.

From theſe and the like conſiderations, it is, in the ESSAY, concluded, that the waters of *Aken* are *not charged* with *ſubſtantial ſulphur*, in the way of *ſolution*. It is demonſtrated, that they are *impregnated* with the *principles of ſulphur*, the *univerſal acid* and *phlogiſton*; which, eſcaping from the water and uniting in the vault, *generate* and *form* the pure *ſulphureous concrete*, there found, which bears *no relation* to *ſublimed flowers*. All this was layed before the *Doctor*'s eyes; it was dinned in his ears *. But to what purpoſe? His eyes, long inured to darkneſs, could not bear the light. And, it is moſt evident, that he wilfully oppoſes convictions, ſhutting his ears againſt the voice of truth and reaſon. How unfit is a man to be an *author*, even a *compiler*, who has not judgment to chooſe his materials? Who is, in any meaſure, averſe to information and conviction?

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* See the ESSAY, P. III. p. 69, 70, &c.

So much for *our compiler*'s natural, now for his artificial, analyſis. In this, he ſets out with a groſs miſrepreſentation: he ſays, *the deſtilled water is ſweet.* The ESSAY on Waters gives a number of proofs of a *volatil*, *acid ſpirit* in the waters; P. III. p. 65, &c. After this, it ſhews ſeveral ways, in which it was deſtilled; and in each, the *deſtilled water* gave a *ſenſible taſte*, the *reverſe of ſweet*; it gave every proof of a *diſagreeable auſterity* to the taſte, and of an *acid* upon trial; p. 73, 74, 75, 76. The *Doctor* would rather be ſingular, *new*, even in fallacy and ignorance, than he or the world ſhould be ſet to rights, publicly, by his *quondam* apothecary.

Our *abſtracter*, in the ſame paragraph, teaches us, that *a gallon of the water left half an ounce of ſolid matter*, *conſiſting of a fourth or fiveth part*, no matter which, *of terreſtrial matter to the ſaline*, *which laſt*, *upon accurate examination*, *appears to be partly an alcaline and partly a neuter ſalt.* Sure here is wonderful *accuracy*, with the *Doctor!* He is indeed nearer the point than uſual. The difference between a *fourth* and a *fiveth* part is a trifle, in his experiments; while others accurately divide a grane. And who can ſufficiently admire his *preciſion*, that ſhews the ſalt *partly alcaline*, *partly neuter*, though he does not tell the *proportion of either*; nor *determine* the *nature* of the *neuter ſalt*, of which there is ſuch variety. Now, if Dr. *Rutty* had as much regard to *truth* and *juſtice*, as to *vanity*, *ſelf-love* and *novelty*, he would have diſcharged his promiſed duty to the public; and, till he got better authority, or refuted this, he ſhould have embraced what is taught in the ESSAY on Waters, upon repeted experiments, which ſhew, 1. that the *ſolid contents* of the water are almoſt *three times* as much as the *Doctor* makes them; that is, inſtead of *half an ounce*, about *one ounce and two drachms*, in the gallon; which makes about 35 granes to the pint, upon a medium, according to the comparative table, ESSAY, P. III. p. 103; 2. that, of theſe 35 granes, an inconſiderable fraction above *three granes* is an *abſorbent* or *calcarious earth*, and about *three fiveths*, *ſelenite*; 3. that, of the *whole* 35 granes, ſomewhat above *thirty one granes* are a *mixed ſalt*, *partly fixed* and *lixivial*, the pure *mineral alcali*; partly *muriatic*, or *true ſea ſalt*. To which are added, a *volatil*, *vitriolic acid* and the *phlogiſton*, the *principles*, from whoſe *union*, upon eſcaping from the water, and being confined in the *cloſe vaults*, *ſulphur is generated*, not *ſublimed*. See ESSAY, P. III. p. 109, &c.

After ſuch a confuſed notion of the compoſition of theſe waters, as *our Doctor* expreſſes, it is not to be wondered, that the practice founded upon this, ſhould be, as we find it, *abſurd* and *contradictory*. This may be judged from this poſition, Syn. p. 628, *they corroborate in relaxations, and relax in contractions, as is obſerved of our Bath waters.* And the internal uſe is not leſs ridiculous than, *they warm or heat the cold, and cool or attemperate the hot.* But, what better than ſuch inconſiſtencies, may be expected from an *unfair abſtracter?* an *injudicious compiler?* a *pretender*, quite a ſtranger, to *chemiſtry?*

He comes next to the baths of *Baden*, where he glibly ſwallows contradictions, as facts. *Our author*'s author makes *this* ſomewhat like the waters at *Aken*. But, tells us, what his tranſcriber ſeems to have faith to adopt, that though the impregnation of this water with ſolid contents, be inferior to that of *Aken*, that the hot water, of ſome of the ſprings, weighs more, by two granes in an ounce, than the water of a (cold) neighbouring ſpring.

How credible this is, may be judged from this, that a phial of *Aken* bath water, hot in the natural ſtate, weighed five ounces, one ſcruple, ſeventeen granes; while the ſame phial, filled with the ſame water cold, weighed five ounces, two ſcruples and eight granes; that is, eleven granes more, cold than hot, in the ſame volume. The ſame compariſon being made, between the thermal and the common fountane water of the town, the *pure cold* was found to weigh *three granes and an half* more than the ſame volume of the *hot*, *though highly impregnated*, water. See the ESSAY on *Aken* waters; P. III. § 24, § 177. This muſt ever be the caſe in all hot, eſpecially ſpirituous waters; for reaſons, obvious to all capacities, but *our author's*.

He purſues the ſame method of ſwelling his book with wretched and ill-put-together collections from writers upon other baths, ſuch as thoſe of *Wolfs*, *Herſchberg*, *Bareges*, *Carolsbadt*, *Muhlbrunn*, *Empſen*, *Bourbon*, *Mont d'Or*, *Vichy*, *Melos and Thermia*, *Balaruc*, *Wiſhbad*, *Villa*, *Caldas*, *Aponus*, *and Piſa*, with *ſynoptic* tables of *concerto* experiments, as uſual with *blanks*, by way of *throwing a light upon this intricate ſubject*, *in a method intirely new*. Thus *his light* is always found no better than *darkneſs!*

This catalogue is great and pompous. But, as far as a man who has not ſeen the ſprings, and can therefore onely reaſon by analogy, may judge; every thing offered, with reſpect to theſe, is as abſurd as what relates to the baths of *Aken*. With relation to the authors that treated them, he is really or affectedly unacquainted with them; particularly with BERGER, one of the moſt learned and ingenious writers on this ſubject, who gave the world the beſt account of *Carolſbadt*.

To ſome, it may perhaps ſeem arrogant to ſuppoſe, that a man of *Dr. Rutty's great eminence* muſt neceſſarily have ſeen, and been converſant with ſo obſcure a tract, as the *Eſſay on Waters*; or, becauſe the *learned Doctor* once vouchſafed to know *Charles Lucas*, the *apothecary*, among the number of his *other miniſters* in Dublin; that he ſhould alſo know *Charles Lucas*, M. D. in London, and look upon theſe to be one and the ſame man. If ſo, *Dr. Rutty* is ſurely not to be condemned for *not having abſtracted*, or even *not cited*, a book he never ſaw, or for not mentioning *Dr. Lucas*, a phyſician, of whom *Dr. Rutty* perhaps never heared.

Let ſuch as ſtart this objection know, that about the time, the *Eſſay on Waters* was publiſhed, *Dr. John Rutty*, from *Dublin*, wrote a letter, addreſſed to *Dr. Charles Lucas*, in *London*, which, for the *author*'s ſake, is not here inſerted at full length. But, the purport of the letter was, 'that the *author* heared, that *Dr. Lucas* had publiſhed a diſſertation upon a ſubject, which had for about twenty years engaged Dr. *Rutty*'s attention, and upon which, he was now going to offer the public, the fruits of his labors. Hoped, there would be no claſhing. And propoſed an exchange, deſiring, *as a preſent*, the *Eſſay*; for which, the *Synopſis* ſhould be given *in return*.'

In anſwer to which, *Dr. Rutty* was told, 'that there could not well be any claſhing between the two authors, as the firſt publiſher treated on no waters, the other had ever ſeen. The notion of a bartering preſent was ridiculed, and, from it's inequality, declined; as it muſt be unjuſt to accept *Dr. Rutty*'s labors of one and twenty years, in exchange for works that did not coſt *Dr. Lucas* ſo many months.' Thus the correſpondence ended; which is here introduced to ſhew, that *Dr. Rutty* as well knew, as he was known to, the author of the ESSAY on Waters. And if the *Doctor*, after this, did not read this work, abſtract, extract, and cite, or examine and refute it; he muſt be at ſome loſs for a proper apology to the public; upon whom, he now attempts to impoſe volumes of errors, in this Eſſay, exploded.

Thus I have, within the compaſs of nine days waded through this moſt heavy, maſſive, muddy work, ſlightly, curſorily touching on ſome of his capital miſtakes and errors, in hopes of bringing mine animadverſions within bounds, to intitule them to be read. I could have made many more exceptions, did time and ſcope admit it.

It may be thought, that I onely expoſe the *author*'s faults, overlooking his perfections or beauties. I ſolemnly declare, that to the beſt of my judgement, I have done him juſtice, with moderation: for, ſo far from diſcovering any excellency, any propriety, any thing uſeful or new, that can be called Dr. *Rutty*'s, in his whole labors of one and twenty years; that I know not a paragraph, at this view, that is not in language, manner, matter, propriety, truth, and ſenſe, exceptionable or trivial.

THE END.

[AN APOLOGY.

The Shortneſs of Time, that could be allowed for making this ANALYSIS, muſt have occaſioned many Errors and Omiſſions, which have eſcaped the Author, as well as the Printer. The humane Reader is therefore deſired to make the following, among other neceſſary

CORRECTIONS.

Page 2. line 33. for is, read are. P. 4. l. 23. for climing, r. climbing. P. 9. l. 38. for come, r. came. P. 13. l. 36. after ſulphur, add, and. P. 16. l. 6. after marine, add, or other. l. 15. for effuſion, r. affuſion. l. 33. after lime, add, , P. 20. l. 31. before worſt, add the. P. 22. l. after methods, add. are. P. 24. l. 10. for ſparklings, r. ſparkling. P. 28. l. 19. for theſe, r. certain. P. 38. l. 36, 37. for as well as, r. and ; after bath, add ſee p. 50. P. 42. l. 29. for that, r. this. P. 49. l. 20. for differ, r. ſuffer. P. 52. l. 8. for water, r. waters. P. 52. l. 32. for 851, r. 151. P. 53. l. 19. for hydometre, r. hydrometre. P. 54. l. 17. for If it then, r. If the chalybeate then. l. 22. d. *blood.* P. 55. l. 6. for were, r. are. l. 20. for water, r. water's. l. 34. for part, r. parts. P. 56. l. 24. after *element,* tranſpoſe the following ſentence thus ; all moſt intimately blended, as they are moſt wonderfully produced, by the inimitable chemiſtry of PARENT NATURE ; without any appearance of *vitriolate tartar* ; which muſt have attended the *Doctor*'s artificial compoſition. Now, all this &c. P. 58. l. 1. after waters, add with acids. P. 62. l. 7. after chooſes, add, rather. P. 63. l. 22. after not, add, of. P. 67. l. 2. after *ſalino-,* add *nitroſo-.* P. 69. l. 32. before *clay,* add, or *other.* P. 80. l. 1. before ſays, add, after. P. 82. l. 38. for Fouſanche, r. Fonſanche.

An ESSAY ON WATERS. In three Parts.

Treating I. Of SIMPLE WATERS. II. Of COLD, MEDICATED WATERS. III. Of NATURAL BATHS.

OF THIS WORK,

PART I. Contains, 1. A general idea of matter in the various productions of the mineral, vegetable, animal, and atmoſpherical kingdoms. 2. A demonſtration of the principles of natural bodies. 3. A general idea of SALTS, and a particular explanation of the origins, diſtinguiſhing characteriſtics, natures, powers and properties of ACIDS and ACALIES, as well as of NEUTER SALTS, and all their various combinations with each other, with oils or fats, with bitumens and ſulphur, with earths and ſtones, with metals and metallics; ſhewing how waters become with theſe impregnated, by the means of different ſalts, and how the different impregnations and combinations are to be diſcovered, and reſolved. 4. The names, definition and general diſtinctions of water. The nature and properties of SIMPLE WATER, it's various trials and choice. 5. The ſenſible qualities, analyſis, nature and properties, virtues, uſes and abuſes, phyſical, oeconomical, mechanical and medicinal, as well internal as topical, and cold as hot, of the ſeveral waters of the THAMES, NEW RIVER, HAMPSTEAD, RATHBONE-PLACE, CROWDER'S-WELL, LAMB'S-CONDUIT, and ſeveral of the pump-wells in London.

PART II. Contains, 1. The definition, diſtinguiſhing characteriſtics and various kinds and manners of impregnation of MINERAL WATERS in general. 2. The origin and properties of SALT WATERS in general. 3. The natural hiſtory, ſenſible qualities, analyſis, nature and properties, virtues, uſes and abuſes, phyſical, oeconomical, mechanical, and medical, as well internal as external, of ſeveral SALT SPRINGS, of SEA WATER, and of the medicated waters of EPSOM, and CHELTENHAM, of the POUHON, SAUVENIERE, GROISBEECK, GERONSTER, POUHON PIA, BARRISART, WATROZ, TONNELET, in and about Spa; of the COUVE, BEVERSEE, LA SIGE, GEROMONT, BRUE or CHEVRON, and others, in or about the principality of Stavelot, and TUNBRIDGE in Kent. To which are added the topography, and the natural hiſtory of the place of each ſpring; together with the kinds of accommodations, which patients may have contiguous to each medicated water.

PART III. Contains, 1. The name, definition and diſtinctions of baths in general. 2. The topography, natural and civil hiſtory of the city of AKEN, or Aix la Chapelle; an account of the climate, and the ſoil and it's productions; the hiſtory and deſcriptions of it's BATHS and their SOURCES; the ſenſible qualities, analyſis, nature and properties, virtues, uſes and abuſes, phyſical, oeconomical, mechanical and medicinal, of the waters, with the various manners and times of applying them, as well external as internal: with an explanation of the cauſes of heat, and the various means of impregnation of ſuch baths, and a particular account of the production of ſulphur in the vapor of the baths, different from any, yet given. 5. The like topography, and hiſtory of the town of BORSET, of the cities of BATH and BRISTOL, with an account and explanation of the ſenſible qualities, analyſis, nature and properties, virtues, uſes and abuſes, phyſical, oeconomical, mechanical, and medicinal, internal and external, of their ſeveral baths.

All taken from actual experiments, remarks and obſervations, made at the ſeveral ſources, and repeted and proved in different ſeaſons.

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